MITSUBISHI ELECTRIC

NC-EDM SYSTEMS

Changes for the Better

MA VA/VH EA Advance Series

MITSUBISHI NC EDM

Mitsubishi Electric Corporation Nagoya Works is a factory certified for ISO14001 (standards for environmental management systems) and ISO9001(standards for quality assurance management systems)

ISO 14001 JACO EC97J1113 — UKAS ENVIRONMENTAL MANAGEMENT 051

ISO 9001 BUREAU VERITAS Certification — UKAS QUALITY MANAGEMENT 008

BREAKTHROUGH INNOVATION

for a greener tomorrow eco Changes

Pursuing Machining Accuracy and Speed Handed Down for Generations

The history of Mitsubishi Electric EDMs is the history of electrical-discharge machining

Mitsubishi Electric EDMs have continued to advance to answer market needs, which continue to change with the times. We have searched for specifications which answer those needs, and are now leading the world of electrical-discharge machining with a powerful line-up for new machining fields.

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Ultrahigh-accuracy EDM

MA2000

64-bit CNC
(Automatic elevation tank)

±0.002mm(0.00008")achieved

※The machining accuracy follows the Mitsubishi Electric machining conditions.

Model	MA2000M
Stroke (mm) (in)	X: 400 (15.7) Y: 300 (11.8) Z: 300 (11.8)
Max. workpiece dimensions (mm) (in)	600 (23.6) x 450 (17.7) x 250 (9.8)
Max. workpiece weight (kg) (lb.)	700 (1540)
Max. electrode weight (kg) (lb.)	50 (110)
Max. fluid level (mm) (in)	300 (11.8)

Compact, high-speed, high-accuracy EDM

EA8PV Advance

(Vertical front door)

FP-V power supply (standard)

±0.003mm (0.00011") achieved

※The machining accuracy follows the Mitsubishi Electric machining conditions.

Model	EA8PVM ADVANCE
Stroke (mm) (in)	X: 300 (11.8) Y: 250 (9.8) Z: 250 (9.8)
Max. workpiece dimensions (mm) (in)	740 (29.1) x 470 (18.5) x 130 (5.1)
Max. workpiece weight (kg) (lb.)	550 (1200)
Max. electrode weight (kg) (lb.)	25 (55)
Max. fluid level (mm) (in)	180 (7.1)

High-speed, multi-function EDMs

EA12V Advance

(Automatic elevation tank)

FP-V power supply (standard)

Model	EA12VM ADVANCE
Stroke (mm) (in)	X: 400 (15.7) Y: 300 (11.8) Z: 300 (11.8)
Max. workpiece dimensions (mm) (in)	800 (31.4) x 550 (21.6) x 250 (9.8)
Max. workpiece weight (kg) (lb.)	700 (1540)
Max. electrode weight (kg) (lb.)	50 (110)
Max. fluid level (mm) (in)	300 (11.8)

EA28V Advance

(Automatic elevation tank)

FP-V power supply (standard)

Model	EA28VM ADVANCE
Stroke (mm) (in)	X: 650 (25.5) Y: 450 (17.7) Z: 350 (13.7)
Max. workpiece dimensions (mm) (in)	1050 (41.3) x 760 (29.9) x 350 (13.7)
Max. workpiece weight (kg) (lb.)	2000 (4400)
Max. electrode weight (kg) (lb.)	200 (440) (with standard electrode mounting table)
Max. fluid level (mm) (in)	400 (15.7)

Compact EDM

EA8

64-bit CNC
(Vertical front door)

Model	EA8M
Stroke (mm) (in)	X: 300 (11.8) Y: 250 (9.8) Z: 250 (9.8)
Max. workpiece dimensions (mm) (in)	740 (29.1) x 470 (18.5) x 150 (5.9)
Max. workpiece weight (kg) (lb.)	550 (1200)
Max. electrode weight (kg) (lb.)	25 (55)
Max. fluid level (mm) (in)	200 (7.8)

Medium-sized EDM

EA12D

64-bit CNC
(Vertical front door)

Model	EA12DM
Stroke (mm) (in)	X: 400 (15.7) Y: 300 (11.8) Z: 300 (11.8)
Max. workpiece dimensions (mm) (in)	1000 (39.3) x 650 (25.5) x 350 (13.7)
Max. workpiece weight (kg) (lb.)	1000 (2200)
Max. electrode weight (kg) (lb.)	50 (110)
Max. fluid level (mm) (in)	400 (15.7)

Large-sized EDMs

EA30

64-bit CNC
(Vertical front door)

Model	EA30M
Stroke (mm) (in)	X: 700 (27.5) Y: 500 (19.6) Z: 350 (13.7)
Max. workpiece dimensions (mm) (in)	1230(49.2)x 800(31.4)x 350(13.7) (standard working tank)
Max. workpiece weight (kg) (lb.)	2000 (4400)
Max. electrode weight (kg) (lb.)	200/440 (with standard electrode mounting table)
Max. fluid level (mm) (in)	400/15.7 (standard working tank)

EA40

64-bit CNC
(Automatic vertical front door)

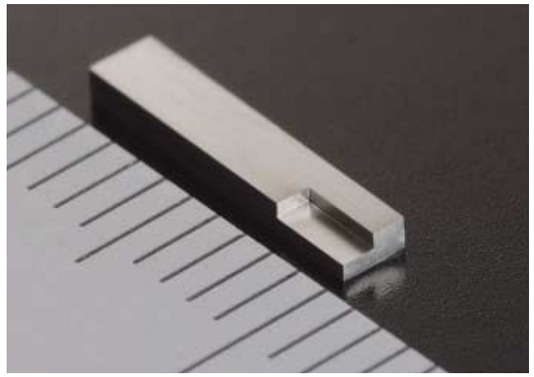
Model	EA40M
Stroke (mm) (in)	X: 1000 (39.3) Y: 600 (23.6) Z: 450 (17.7)
Max. workpiece dimensions (mm) (in)	1500 (59.0) x 1000 (39.3) x 400 (15.7)
Max. workpiece weight (kg) (lb.)	5000 (11000)
Max. electrode weight (kg) (lb.)	300 (660)
Max. fluid level (mm) (in)	450 (17.7)

EA50

64-bit CNC
(Automatic vertical front door)

Model	EA50M
Stroke (mm) (in)	X: 1500 (59.0) Y: 600 (23.6) Z: 600 (23.6)
Max. workpiece dimensions (mm) (in)	2400 (94.4) x 1500 (59.0) x 750 (29.5)
Max. workpiece weight (kg) (lb.)	10000 (22000)
Max. electrode weight (kg) (lb.)	500 (1100)
Max. fluid level (mm) (in)	800 (31.4)

Fine High-accuracy Machining



Example of connector part machining

Model	EA8PV Advance
Workpiece material	ELMAX
Electrode material	3 copper electrodes (electrode undersize 0.05mm (0.002") per side)
In-corner R	0.010mm (0.0004")
Surface roughness	Rz: 0.50μm Ra: 0.10μm
Machining time	45 minutes

Narrow pitch positioning on the incorporated connector is essential for attaining high densities on electrical and electronic parts.
The MA2000 and EA8PV are capable of attaining optimally sharp corners and fine finishing on high-accuracy connectors for flexible printed circuit (FPC) board.

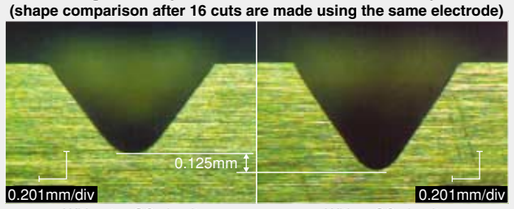
Highly accurate machining shapes

Electrode wear suppression circuit: α-SC circuit (standard for all models)

- Electrode wear is suppressed when machining a steel workpiece with a small copper or copper tungsten electrode
- This circuit is effective for multiple set-up machining and shapes requiring edges
- Compatible with small undersize amounts of 0.03 to 0.07mm per side (0.0012 to 0.0028")

Reduces wear by 10 to 20%
(comparison with conventional Mitsubishi Electric EDM)

Machining of 16 shapes with undersize amount 0.05mm per side (shape comparison after 16 cuts are made using the same electrode)



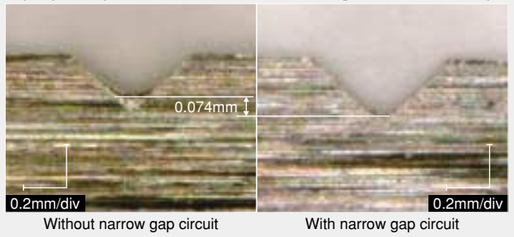
Without α-SC circuit　　With α-SC circuit

Narrow gap circuit (standard for all Advance models)

- Electrode wear is suppressed when machining a steel workpiece with a small copper or copper tungsten electrode
- Compatible with small undersize amounts of 0.015 to 0.03mm per side (0.0006 to 0.0012")

Reduces wear by 20 to 30%
(comparison with conventional Mitsubishi Electric EDM)

Machining of four shapes with undersize amount 0.05mm per side (shape comparison after 4 cuts are made using the same electrode)



Without narrow gap circuit　　With narrow gap circuit

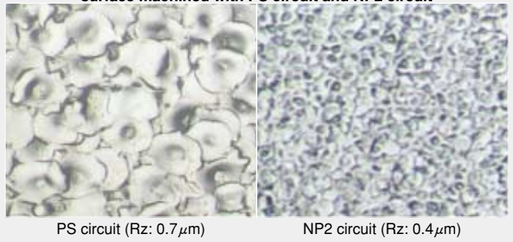
Ultrafine surface

Ultrafine matte finish circuit: NP2 circuit (standard for EA8PV Advance, MA2000)

- This circuit realizes an ultrafine matte surface of Rz: 1μm (Ra: 0.15μm) or less
- Rz: 0.4μm (Ra: 0.06μm) is realized with 10×10mm (0.4×0.4") machining
- Ultrafine electrical-discharge mark is formed with the NP2 circuit

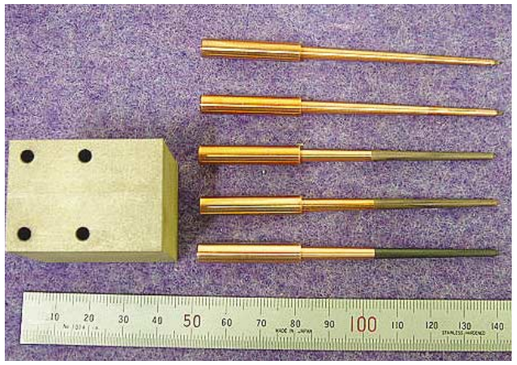
Realizes Rz: 0.4μm (Ra: 0.06μm)

Comparison of electrical-discharge marks on optimum surface machined with PS circuit and NP2 circuit



PS circuit (Rz: 0.7μm)　　NP2 circuit (Rz: 0.4μm)

Rib and Gate Machining



Examples of rib machining

Model	EA12V Advance
Workpiece material	NAK55
Electrode material	Graphite
Machining depth	70mm (2.8")
Surface roughness	Rz: 10μm Ra: 1.7μm
Machining time	7.5 hours

Both low-wear and high-speed machining are required for rib machining of die-cast and plastic molds. The discharge of sludge is especially important.

Example of gate machining

Model	EA12V Advance
Workpiece material	SKD11
Electrode material	Copper
Machining depth	40mm (1.6")
Surface roughness	Rz: 5μm Ra: 0.93μm
Machining time	1.3 hours/hole

The discharge of sludge is especially important for gate machining, which is required for plastic molds.

High-grade rib machining

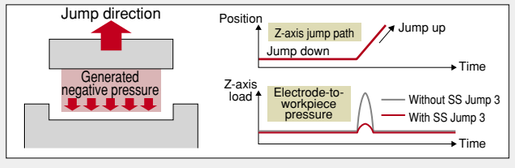
Uniform electrical-discharge gap control: FIT control (standard for all models)

- A uniform machined surface is easily attained during rib machining with long thin electrodes, can flex under the normal gap hydraulics, directly effecting the surface finish

Without FIT　　With FIT

Machining stabilizing jump control: SS Jump 3 (standard for all models)

- This control is effective during jump up operations, when using an electrode with low rigidity, such as for thin ribs
- The load on the electrode is reduced by optimized smoothing of the jump movement, thereby stabilizing machining and increasing the speed



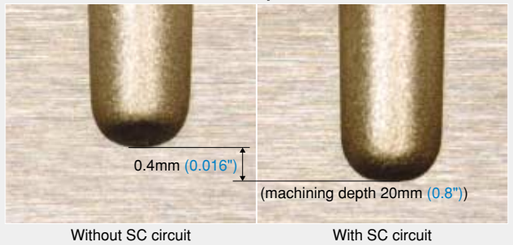
High-grade gate machining

Super-low-wear circuit: SC circuit (standard for all models)

- This circuit is effective when machining with copper electrodes, during which low-wear machining is essential
- The electrode wear is reduced by 10 to 50% during rough machining with an undersize amount of 0.07mm per side or more (0.0028") (comparison with conventional Mitsubishi Electric EDM)
- By suppressing the electrode wear and reducing the number of electrodes used, the total machining time can be shortened and costs can be reduced

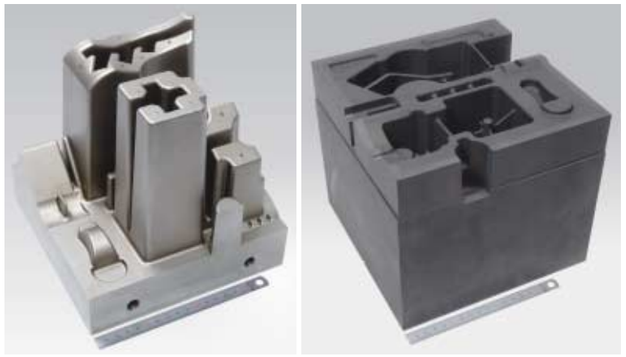
Reduces wear by 10 to 50%
(comparison with conventional Mitsubishi Electric EDM)

Cross-section of 4th spool machined hole



Without SC circuit　　With SC circuit

Large-area Machining



Example of die cast mold machining

Model	EA28V Advance
Workpiece material	SKD61
Electrode material	Graphite
Surface roughness	Rz: 15μm Ra: 2.4μm
Machining time	53 hours

(Electrical-discharge machining after rough milling.)

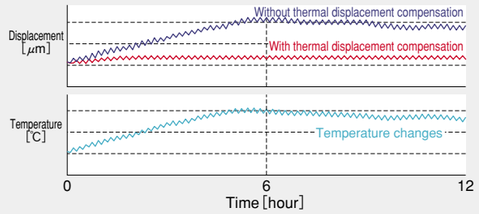
When machining the die for die-casting parts, such as automobile engine cases, tall workpieces are machined with a complex and complicated electrode.
To maintain stable machining, the effect of changes in the environmental temperature must be suppressed to a minimum.

Suppressing displacement movement caused by room temperature changes

Thermal displacement compensation function (standard for all Advance models, MA2000 and EA medium-to large-sized models)

- Changes in room temperature around the machine are recognized and compensated for in real-time
- The machining accuracy during long-time continuous machining is dramatically improved
- This function's effect is further improved by using the fluid circulation function during setup

Stable machining accuracy and high repeatability

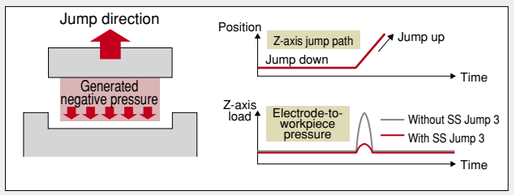


Reducing electrode loading and stabilizing machining

Machining stabilizing jump control: SS Jump 3 (standard for all models)

- This control is effective during jump up operations for flat electrodes on which a large load is applied for large electrodes
- The load on the electrode is reduced by optimized smoothing of the jump movement, thereby stabilizing machining and increasing the speed
- High-accuracy machining can be maintained by reducing the load onto the Z-axis (spindle)

Stabilize machining with a large electrode



Example of machining a large flat area

Model	EA28V Advance
Workpiece material	SKD61
Electrode material	Graphite

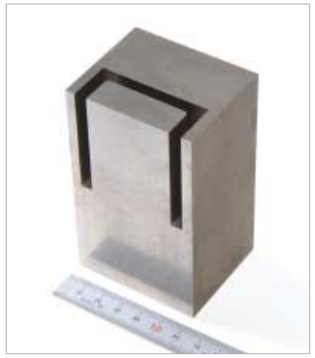
Realizing a uniform surface finish even on flat surfaces.

Example of machining large molded dies

Model	EA40+FP100
Workpiece material	S55C
Electrode material	Graphite
Surface roughness	Rz: 18.0μm

Realizing high speed when machining deep or large workpieces.

Ultrahigh-performance Machining with Graphite Electrode
GF2 control (option for all Advance models)



Example of pocket machining

Model	EA28V Advance (GF2 control)
Workpiece material	SKD61
Electrode material	1 graphite electrode
Machining depth	50mm (2.0")
Surface roughness	Rz: 11μm Ra: 1.9μm
Electrode wear	Length wear ratio 0.04%
Machining time	7 hours 6 minutes

The graphite electrode is used effectively to attain high productivity even during electrode fabrication.
GF2 control realizes stable machining and eliminates excessive wear of the electrode when machining with a graphite electrode.

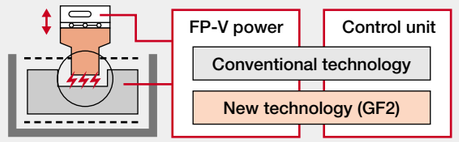
Ultralow-wear machining

Adaptive machining control: GF2 control

- The electrical-discharge state during rough machining is optimally controlled to realize ultralow-wear machining

Attaining a length wear ratio of 0.04%

(Note) The length wear ratio will differ according to the type of graphite electrode, machining details and machining conditions.



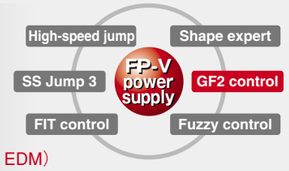
Optimally controlling the electrical-discharge state

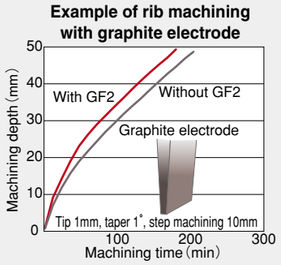
High-speed, deep rib machining

Adaptive machining control: GF2 control + Fuzzy control + SS Jump 3

- Rough machining can be stabilized and the speed increased by using these controls together with the jump control

Machining speed increased by 10 to 20%
Electrode wear improved by 10 to 20%
(comparison with conventional Mitsubishi Electric EDM)





Example of thin-rib machining

Model	EA12V Advance (GF2 control)
Workpiece material	SKD11
Electrode material	3 graphite electrodes (tip 0.2mm)
Machining depth	6mm (0.2")
Surface roughness	Rz: 6.0μm Ra: 1.0μm
Machining time	1 hour 36 minutes

Stable machining and low-wear machining are realized for thin-rib machining.

Example of deep workpiece machining

Model	EA28V Advance (GF2 control specifications)
Workpiece material	SKD61
Machining depth	130mm
Electrode material	Graphite
Surface roughness	Rz: 10μm Ra: 1.6μm

Stable machining of deep workpieces (130mm), for which fluid treatment is insufficient, is possible (electrical-discharge machining after rough milling).

High-speed, High-grade Finish

(NS powder specifications - option 〈EA12V/EA28V Advance〉)

Glossy surface machining

Model	EA12V (NS powder specifications)
Workpiece material	SKH51
Electrode material	Copper
Surface roughness	Rz: 1.1μm Ra: 0.15μm
Machining time	9 hours

When finishing with NS powder, a uniform and high-grade finished surface can be attained compared to surfaces machined with normal dielectric fluid.
Pinholes and stains, are suppressed, and the time required for the mold finishing process is greatly reduced.
An easy-to-polish matte surface finish, and polish-less glossy surface finish can be realized.

Realizing high-grade finished surfaces

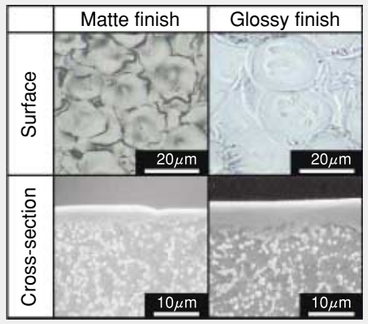
NS powder

- An uniform matte surface and polish-less glossy surface can be machined simply by adding NS powder to the dielectric fluid
- Pinholes, stains and surface flatness are suppressed

Powder ability based on material

Non-glossy	Glossy*
SKD11	SKD61
NAK55	NAK80
RIGOH	STAVAX
HPM38	YXR3
DC53	YXR33
S55C	HPM50
Aluminum alloy	DAC
Zinc alloy	DEX20
Tungsten carbide	

* Affected by workpiece's heat treatment.

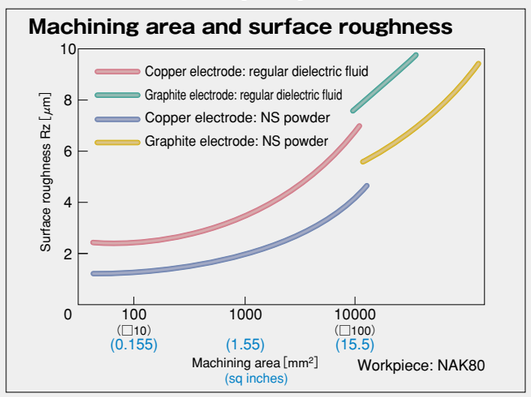


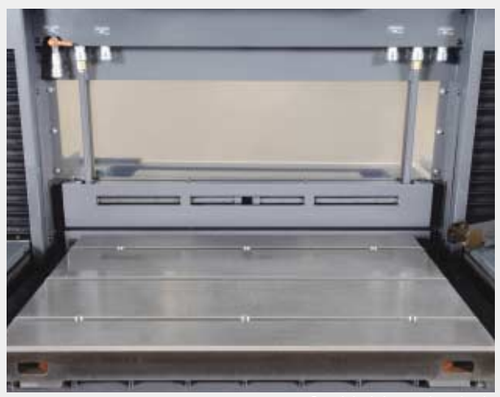
Highly efficient finishing with large electrode areas

NS powder specifications

- The NS powder added to the dielectric fluid is dispersed by stirring the fluid in the working tank and dielectric fluid reservoir, thus improving machining stability
- Effective for finish machining of large electrode areas

Machining area and surface roughness





Special stirring equipped unit.

Contact your local Mitsubishi Electric sales office or dealer for details on purchasing NS powder.

Other Machining

Examples of contour machining

Model	MA2000 + spindle specifications
Workpiece material	HAP40
Electrode material	Copper

Contours can be machined using a rod-shaped electrode based on data drafted with the CAD. A glossy surface can be machined even without using the NS powder specifications.

Examples of tungsten carbide fine-surface machining

Model	EA8PV Advance
Workpiece material	Tungsten carbide (G3 or equivalent)
Electrode material	Copper tungsten

Using the NP2 circuit, machining of Rz: 1μm (≒ Ra: 0.15μm) or less is possible even in tungsten carbide machining. This is especially useful when machining complicated patterns where orbiting is not possible.

Examples of machining medical parts

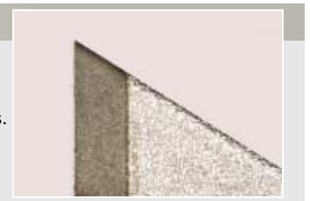
Model	EA12V Advance
Workpiece material	Chromium-cobalt alloy
Electrode material	Graphite

Titanium and cobalt alloys used in medical parts can also be machined with electrical-discharge machining. The high-performance of EDMs with the FP-V power supply is also suitable for machining various special materials used in aircraft.

Example of tool machining

Model	EA12V Advance
Workpiece material	PCD + steel material
Electrode material	Copper

Industrial diamond (PCD, CBN) shapes, used for industrial machines, can be machined with little damage and less cracks.



Example of fine-hole machining

Model	EA12V Advance + fine-hole specifications
Workpiece material	STAVAX (t25.4mm)
Electrode material	ϕ0.7 copper pipe electrode

Fine holes approx. ϕ0.2 to 1.0mm in size can be machined with the Fine-hole jig option. This function can also be used as a start hole for wire EDM processing.

FP power supply, FP-V power supply

- The FP power supply equipped in the EA/VA/MA Series, and the FP-V power supply equipped in the EA-V Advance Series can be used for machining molds, and for electrical-discharge machining in various applications and fields
- Extremely hard materials, which are difficult to mill or grind, as well as special materials and ultrafine areas can also be machined

Full of useful options

- The EDM is used in a variety of applications and fields Optimum machining can be realized with various special specifications such as the indexing unit (A, B and C axes), spindle unit, special working tank and column up (Options may be limited according to the model. Refer to the product information section for details)

Reaching New Levels with Evolutionary Technology and the New Advance Control Unit

Ergonomic design
- User-friendly keyboard and mouse
- Easy-to-view screen (15-inch)
- Intuitive operations using Touch-panel control

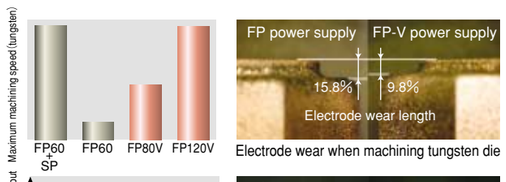
Advanced V Technology

Refined style, high-performance energy-saving power supply, ample know-how

Machining

FP-V power supply

- Circuits suitable for various machining
- Machine even tungsten carbide at high speed with low electrode wear
- Energy-saving power supply reduces operating cost



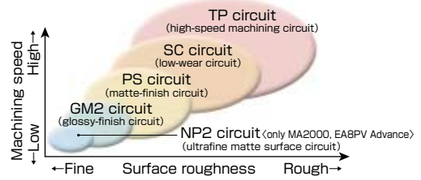
Electrode wear when machining tungsten die

Machined surface with cracks | Machined surface with few cracks

Cross-section of tungsten-machined workpiece

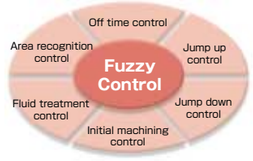
Fine-finishing circuit (NP2, GM2 circuits)

- Optimum surface machining aiming to eliminate polishing
- Realizes Rz 0.4μm (Ra 0.06μm) with matte and glossy surface



Machining adaptive control

- Automatically adjusts to optimum conditions according to the machining state
- Performance of machining with graphite electrode is improved (GF2 control option)



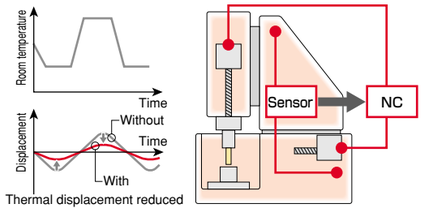
Machine

Semi-cabin structure

- Reduce thermal displacement caused by temperature changes

Thermal displacement compensation function (all Advance models)

- Reduces thermal displacement caused by temperature changes
- Stabilizes the accuracy during long-time continuous machining



Maintenance

Easy maintenance

- Maintenance space has been consolidated to improve workability
- Easy consumable parts replacement and cleaning
- A long-life fine-mesh filter is incorporated (replaceable during machining)

EA12V Advance
EA28V Advance

New Control Unit with Three Functions

Easy-Advance Pursuing operability and ease-of-use (refer to page 13 for details.)

Large screen and outstanding operability

- 15-inch LCD touch panel incorporated
- Easy-to-use menu configuration reduces key strokes

Machining condition search (shape expert)

- Machining condition methods, such as gate, threads and helical, which are difficult to program, are supported with dedicated screens

3D-Advance Use advanced 3D data in the workshop (refer to page 15 for details.)

Fully utilizing 3D CAD data

- Import machining instruction information (EPX) and 3D models of electrodes and workpieces (Parasolid) from the CAD/CAM
- Use 3D data in the workshop to visually confirm machining position, and assist set-up and machining
- Calculate changes in the electrical-discharge machining area from the 3D model, and optimize the machining conditions (3D-EXPERT)

Net-Advance Advanced support services using net technology

Update system software via the Web!
This is available only to DIAX-NET.COM members.

- Update system software to the latest version from the support website DIAX-NET
- Simultaneously update EDM contents (e-manual, alarm guide, technical know-how)

e-manual
Browse through operation methods

Alarm guide
Display countermeasures for alarms

Technical know-how
View the latest know-how

DIAX-NET.COM http://www.diax-net.com/

* The Advance control unit is incorporated only in Advance models.

Advance Control Unit

Easy-Advance Pursuing operability to higher levels

Easy-Advance

Supporting machining of various shapes with optimum machining conditions and easy programming

Machining support —ESPERADVANCE

Advanced program support functions

■Navigator

- Simple programming method even for beginners
- Easily create programs by following the on-screen instructions

■Electrode Workpiece measurement

- Ample measurement patterns (pole, hole, 2-face, 3-face, 4-face)
- Core deviation can be set when multiple electrodes are used
- Preset workpiece coordinates (max. 106 types)

■3D check

- Display workpiece layout and electrode movement as animations using 3D models

■Schedule registration

- Continuously run multiple programs on a schedule
- Schedules can be added and edited during machining

Main menu

■File

- Exchange program data with external computers

■Set-up

- Workpiece and electrode measurements are supported with graphical screens

■Monitor

- Machining state is displayed in real-time

■Maintenance

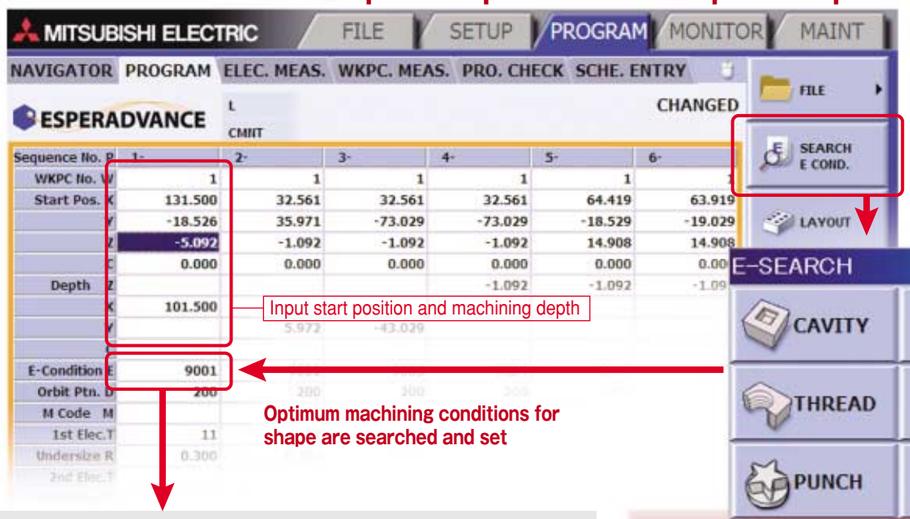
- Replacement timing for various parts is displayed
- Network version updates

■User customization

- Freely rearrange switches and status displays which are used frequently

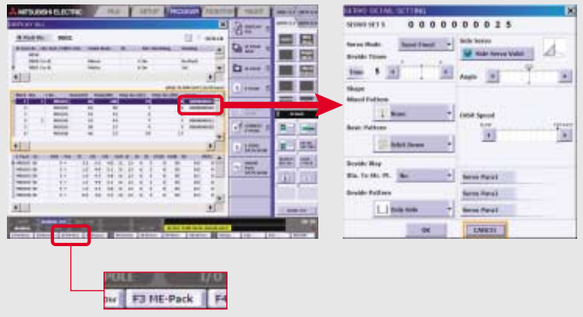
■Machining program

- Programming is possible simply by inputting the machining start position and machining depth, etc., into a table format



Machining conditions (ME Pack)

- Easily change the approach amount between machining conditions
- Graphical and easy-to-understand screen settings



Machining condition search (shape expert)

Machining conditions and programs suitable for various shapes can be created

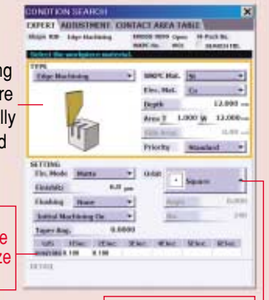
■Cavity

- Increased orbit pattern line-up

■Rib

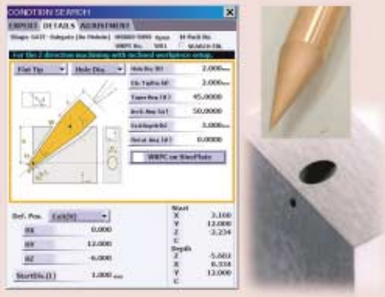
- Set machining condition to match the pocket rib and edge rib

Machining details are graphically displayed



■Gate

- Easily create programs for sub-gate machining

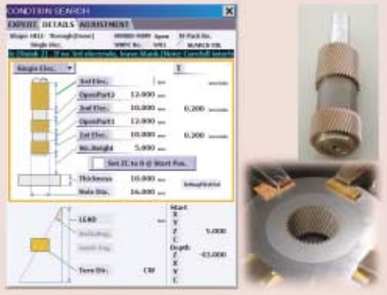


■Threads

- Programs for rough/finish machining with one electrode are supported

■Helical

- A variety of helical machining is possible
- Programs for rough/finish machining with one electrode are supported



*The Advance control unit is incorporated only in Advance models.

Advance Control Unit

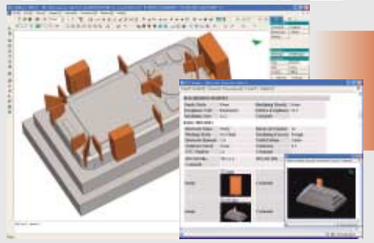
Using advanced 3D data at machining site

3D-Advance

Extensively using 3D CAD data at the workshop

Accessible CAD/CAM system

CamMagicAD



Batch output of the machining position coordinates, core alignment position, 3D models and machining instructions.

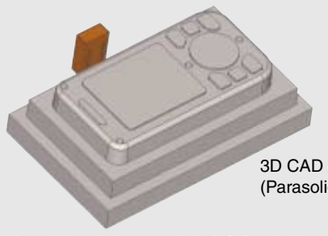
EPX-compatible CAD/CAM

EPX data

* EPX is a machining condition conversion format for die-sinking EDMs enforced by the Japan Die & Mold Industry Association.

The EPX file does not include the core alignment measurement position information.

3D CAD/CAM



3D CAD data
(Parasolid)

* Parasolid is an industry standard 3D CAD model format, and is a registered trademark of UGS PLM Solutions Co. Ltd.

Cutting simulator

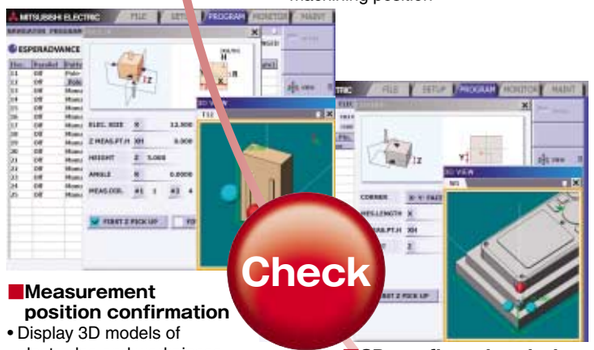
Simulation results
Workpiece model after cutting (STL format)

Advance control unit functions

■3D import
- Read in machining instruction information (EPX) and 3D models of electrodes and workpieces (Parasolid) from CAD/CAM

CAM

■3D view machining position confirmation
- Display 3D models of electrodes and workpieces simultaneously to match the machining position



■Measurement position confirmation
- Display 3D models of electrodes and workpieces
- Easily check the core alignment measurement position

Check

■3D confirmation during setup
- Display designated 3D models even during set-up
- Carry out work while comparing with the actual part

Set-up

■3D check
- Conduct preliminary review of the machining and core alignment measurement process with animated displays
- Convenient for checking interference and stroke end, and checking the electrode mounting state

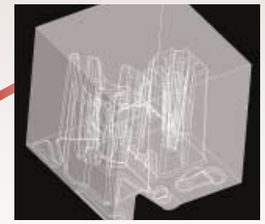
Industry first! Area recognition and machining condition optimization considering rough pre-milling.

3D-EXPERT

- Changes in the electrical-discharge machining area are accurately calculated with 3D models of the electrode and workpiece
- Optimum machining conditions are generated at the start of electrical discharge, thus increasing the machining stability and speed
- The cutting simulation results workpiece data (STL) can be used to attain an effect even when rough-milling the workpieces

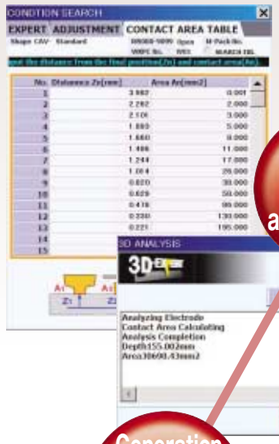
Workpiece model
(STL or Parasolid)

Workpiece before
electrical-discharge machining



Electrode model (Parasolid)

Graphite electrode



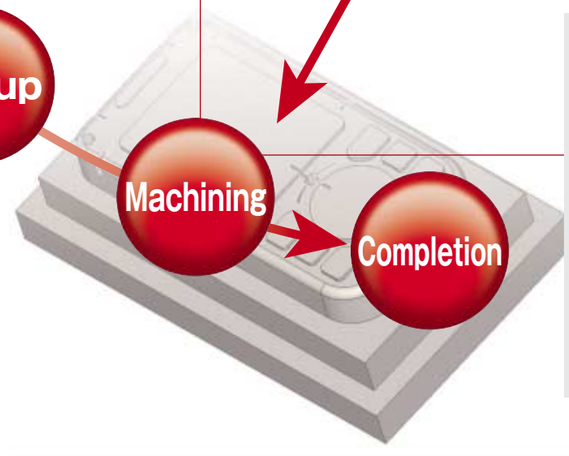
Analysis of machining area changes

Generation of optimum machining conditions

After electrical-discharge machining

Machining

Completion

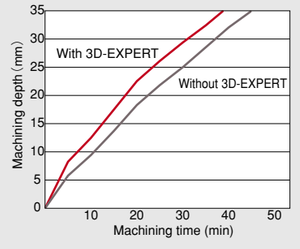


Examples of machining where area changes

- Area is calculated accurately taking workpiece and electrode shape into consideration
- Machining conditions for rough machining can be set easily, thus increasing the machining stability and speed

Workpiece

Graphite electrode



(Note) The machining performance may change according to the machining details.

*The Advance control unit is incorporated only in Advance models.

EA8PV Advance

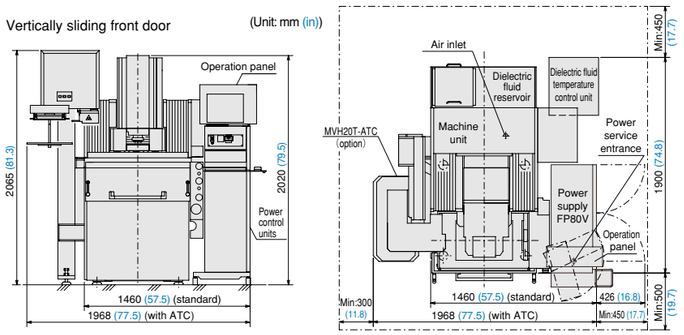
Uniting High-accuracy Technology with High-speed FP-V Power Supply Control Technology

Machining accuracy ±0.003mm (0.00011") achieved (Note 1)
Compact, high-performance, high-accuracy EDM

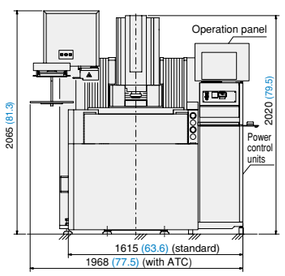
(Note 1) The machining accuracy follows the Mitsubishi Electric machining conditions.

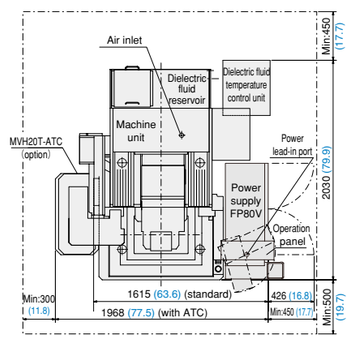
Working tank inner dimensions	770x500x230mm (30.3x19.6x9.0")
Stroke	300x250x250mm (11.8x9.8x9.8")
Machine unit dimensions	1460x1900mm (57.0x74.8")
System total weight	2000kg (4400lb.)
Dielectric fluid reservoir capacity	165 ℓ (43.6gal.)

Vertically sliding front door (Unit: mm (in))

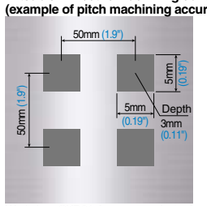


Automatic elevation tank (option)





Mitsubishi Electric machining conditions (example of pitch machining accuracy)



Workpiece SKD61: four copper electrodes
Room temperature during machining: 20±1°C

Standard functions

- Tungsten carbide machining circuit
- Ultrafine matte finish circuit (NP2 circuit)
- Fine matte finish circuit (PS circuit)
- Glossy mirror finish circuit (GM2 circuit)
- Narrow gap circuit
- Thermal displacement compensation system
- XYZ-axis linear scale
- High-accuracy positioning circuit
- 70mm (2.8in) granite table
- LAN

Options

- High-accuracy built-in C-axis
- High-accuracy built-in spindle
- Automatic clamp
- Shuttle-type ATC
- MVH20T-ATC
- Fine-hole jig specifications (ϕ0.15 (0.006) to 2.0 (0.0079) mm (in))
- Advanced manual control box
- Emission/suction automatic changeover
- Programmable flushing nozzle (eight nozzles) + Automatic changeover (combined use with shuttle-type 4T/7T is not possible)
- Dielectric fluid distributor
- GF2 control
- 110mm (4.3in) granite table
- Automatic elevation tank (option)

Standard delivery entrance

	Width [mm (in)]	Height [mm (in)]
Standard specifications	1333 (52.5)	2120 (83.5)
Shuttle 4T-ATC specifications	1572 (61.9)	2120 (83.5)
Shuttle 7T-ATC specifications	1743 (68.6)	2120 (83.5)
MVH20T-ATC specifications	1616 (63.6)	2120 (83.5)

Outstanding operability ①

- 15-inch LCD touch panel
- Easy-to-use menu configuration
- Machining conditions search (shape expert)

Utilizing CAD data ②

- Machining instruction information (EPX) can be read from CAD/CAM
- 3D data (Parasolid) can be read in
- Area changes can be calculated from 3D model to optimize machining conditions (3D-EXPERT)

High-accuracy technology perfect for ultra-precise machining ③

- Thermal displacement compensation function, refined with the MA2000, is provided
- Highly accurate set-up is possible with the dielectric fluid circulation function
- Optimum stroke and high pitch accuracy are possible with shift electrodes and multiple set-up machining

Produce ultrafine finishes ④

- Circuit for eliminating static capacity suspended between electrode and workpiece (NP2 circuit) is provided
- Standard granite table
- Machine narrow pitch connectors using the narrow gap circuit

New high-speed FP-V power supply ⑤

- Tungsten carbide machining circuit is standard equipment
- Machining speed and electrode wear are both improved
- Energy-saving power supply is standard equipment (20% reduction compared to Mitsubishi Electric FP power supply)

Space saving, less oil usage

- Smallest size in the same stroke class has been realized (as of January 2008)

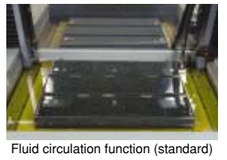
Maintenance ⑥

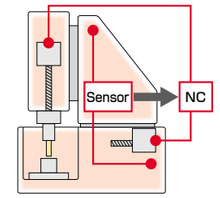
- Maintenance space has been arranged at the back of the machine to improve workability
- A long-life, fine-mesh filter is incorporated

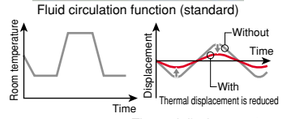
① Advance control unit (shift electrode)

② Utilizing 3D CAD data

③ Fluid circulation function (standard)



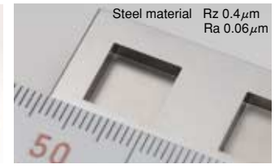




Thermal displacement compensation function

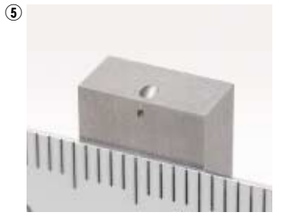
④

Fine, high-accuracy machining



Ultrafine matte surface finishing (□10mm) (NP2 circuit)

⑤



Tungsten carbide sub-gate

⑥

Dielectric fluid reservoir

Machine unit (standard specifications)

〈 〉: Values in parentheses are for automatic elevation tank.

Model		EA8PVM ADVANCE
Machine unit	Dimensions (W x D x H)	1460 x 1900 x 2020 (57.5 x 74.8 x 79.5) [mm (in)] 〈1615 x 2030 x 2020〉 (63.6 x 79.9 x 79.5) [mm (in)]
	Total system weight	2000 (4400) [kg (lb.)]
Axis stroke	(X x Y x Z)	300 x 250 x 250 (11.8 x 9.8 x 9.8) [mm (in)]
Spindle	Distance between table and electrode mounting surface	223 to 473 (8.8 to 18.6) (70 (2.8) granite table specifications) [mm (in)]
	Max. electrode weight	25 (55) [kg (lb.)]
Working tank	Method	Vertical front door 〈Automatic elevation tank〉
	Inner dimensions (W x D x H)	770 x 500 x 230 (30.3 x 19.7 x 9.1) (70 (2.8) granite table specifications) [mm (in)] 〈760 x 520 x 260〉 (29.9 x 20.5 x 10.2) (70 (2.8) granite table specifications) [mm (in)]
	Fluid level adjustment range (from top of table)	90 to 180 (3.5 to 7.1) (70 (2.8) granite table specifications) [mm (in)] 〈85 to 210 (3.5 to 8.3)〉 (70 (2.8) granite table specifications) [mm (in)]
Table (granite)	Dimensions (W x D)	500 x 350 (19.7 x 13.8) [mm (in)]
	Max. workpiece dimensions (W x D x H)	740 x 470 x 130 (29.1 x 18.5 x 5.1) (70 (2.8) granite table specifications) [mm (in)] 〈730 x 490 x 160〉 (28.7 x 19.3 x 6.3) (70 (2.8) granite table specifications) [mm (in)]
	Max. loading weight	550 (1210) [kg (lb.)]
	T-slot	Two slots at 13-120 pitch
Dielectric fluid reservoir	Capacity (initial dielectric fluid supply amount)	165 (43.6) [ℓ (gal.)] 〈165 (43.6) (175 (46.2))〉 [ℓ (gal.)]
	Filtering method	One fine paper filter
	Dielectric fluid temperature control unit	Unit cooler

Distance between table and electrode mounting surface (70mm granite table specifications)

		3R-MACRO	EROWA	3R-Combi	
				MACRO	Jr
C-axis	[mm (in)]	158 to 408 (6.2 to 16.1)	175.5 to 425.5 (6.9 to 16.8)	158 to 408 (6.2 to 16.1)	168 to 418 (6.6 to 16.5)
Spindle	[mm (in)]	161 to 411 (6.3 to 16.2)	178.5 to 428.5 (7.0 to 16.9)	161 to 411 (6.3 to 16.2)	171 to 421 (6.7 to 16.6)
Automatic clamp	[mm (in)]	221 to 471 (8.7 to 18.5)	230.5 to 480.5 (9.1 to 18.9)	221 to 471 (8.7 to 18.5)	231 to 481 (9.1 to 18.9)

C-axis/ATC (option)

				3R		EROWA	
				MACRO	Combi	ITS	COMBI
C-axis		Max. electrode weight	10 (22) (Note 1) [kg (lb.)]	○	○	○	○
	Spindle	Speed	1 to 30 [min-1]				
		Max. electrode weight	5 (11) (Note 1) [kg (lb.)]	○	○	○	○
		Speed	1 to 1500 [min-1]				
ATC	Shuttle 4T(Note 5)	Max. electrode dimensions	70 x 70 x 100 (2.8 x 2.8 x 3.9) [mm (in)]	○	—	○	(Note 4)
		Max. electrode weight	5kg (11lb.)/ electrode Magazine total: 20kg (44lb.)				
	Shuttle 7T(Note 5)	Max. electrode dimensions	35 x 35 x 100(Note 2) (1.4 x 1.4 x 3.9(Note 2)) [mm (in)]	—	○	—	—
		Max. electrode weight	2.5kg (5lb.)/ electrode Magazine total: 10kg (22lb.)				
	MVH 20T	Max. electrode dimensions	70 x 70 x 175 (2.8 x 2.8 x 6.9) [mm (in)]	○	○	○	(Note 4)
		Max. electrode weight	10kg (22lb.)/ electrode Magazine total: 80kg (176lb.) (Note 3)				

(Note 1) For MACRO Jr of 3R-Combi and Compact of EROWA-COMBI, the weight is 2.5kg (5.5lb)/electrode.
(Note 2) When using four electrodes, the dimensions are 70 x 70 x 100(mm)(2.7 x 2.7 x 3.9(in)). The magazine total is 10kg (22lb.).
(Note 3) For MACRO of 3R-Combi, the weight is 5kg (11lb.)/ electrode, and is 2.5kg (5lb.)/ electrode with MACRO Jr. In both cases, the magazine total is 40kg (88lb.).
(Note 4) ATC can be used with EROWA ITS50, but not with EROWA Compact (manual only).
(Note 5) The working tank automatic elevation specifications and shuttle-type ATC cannot be combined.

EA12V Advance

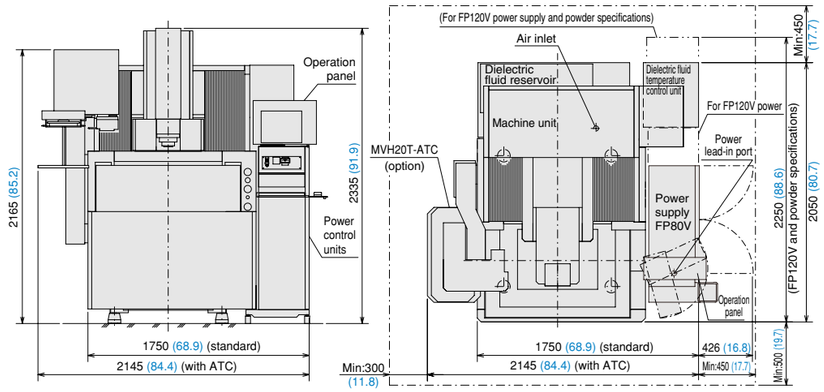
Best-selling EDM Featuring Highly Advanced Accuracy and Productivity

MVH20T-ATC
C-axis (option)

C-axis (option)

High-performance die-sinking EDM with FP-V power supply

Working tank inner dimensions	: 850x600x350mm (33.4x23.6x13.7")
Stroke	: 400x300x300mm (15.7x11.8x11.8")
Machine unit dimensions	: 1750x2050mm (68.8x80.7")
System total weight	: 3725kg (8200lb.)
Dielectric fluid reservoir capacity	: 340 ℓ (89gal.)



(Unit: mm (in))

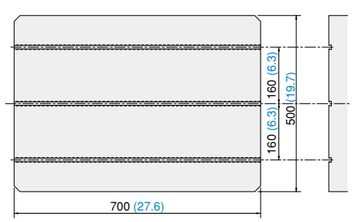
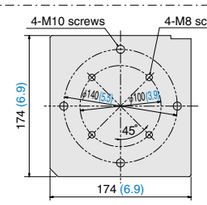


Table (upper surface) dimension drawing



Electrode mounting table dimension drawing

* The 3R/ EROWA electrode holder is used when the built-in C-axis/ automatic clamp (option) is provided.

Standard functions

- Tungsten carbide machining circuit
- Fine matte finish circuit (PS circuit)
- Glossy mirror finish circuit (GM2 circuit)
- Narrow gap circuit
- Thermal displacement compensation system
- XYZ-axis linear scale
- High-accuracy positioning circuit
- Multi-position working tank
- Working tank fluid flow adjustment function
- LAN

Options

- Column up (100 (3.9) mm (in)) specifications
- Highly rigid built-in C-axis
- High-accuracy built-in spindle
- Automatic clamp
- MVH20T/40T-ATC
- NS 1 powder specifications
- Fine-hole machining jig (ϕ0.15 (0.006) to 2.0 (0.079) mm (in))
- Advanced manual control box
- Emission/suction automatic changeover
- Programmable flushing nozzle (eight nozzles) + Automatic changeover
- Fluid pressure 3-step changeover
- Dielectric fluid distributor
- FP120V
- GF2 control

Standard delivery entrance

	Width [mm (in)]	Height [mm (in)]
Standard specifications	1670 (65.7)	2380 (93.7)
MVH20T-ATC specifications	2065 (81.3)	2380 (93.7)
MVH40T-ATC specifications (Note 1)	1670 (65.7)	2380 (93.7)

(Note 1) For the MVH40T-ATC specifications, the ATC unit and holder are removed before shipment. A crane or lifting device is required when installing the system.

Outstanding operability —①

- 15-inch LCD touch panel
- Easy-to-use menu configuration
- Machining conditions search (shape expert)

Utilizing CAD data —②

- Machining instruction information (EPX) can be read from CAD/CAM
- 3D data (Parasolid) can be read in
- Area changes can be calculated from 3D model to optimize machining conditions (3D-EXPERT)

New high-speed FP-V power supply —③

- Provides greatly improved machining speed and the tungsten carbide circuit is standard
- Energy-saving power supply is standard equipment (20% reduction compared to Mitsubishi Electric FP power supply)
- FP120V power supply is suitable for high-speed rough machining and is available as an option

High quality —④

- The high-quality machining surface enables use for various applications
- Easy-to-polish fine matte surface finish machining
- No-polishing glossy surface machining

High-accuracy technology —⑤

- A heat-shielding cabin structure is incorporated
- Thermal displacement compensation function, refined with the MA2000, is provided
- X, Y and Z axes are equipped with a linear scale as standard equipment

Improved set-up workability —⑥

- The three-sided drop tank improves access for work set-up
- Adjustable fluid flow rates increase the range of no-flush machining
- High accuracy attained with the fluid circulation function

Maintenance —⑦

- Maintenance space has been arranged at the back of the machine to improve workability
- A long-life fine-mesh filter, which can be replaced even during machining, is incorporated
- Inside of working tank can be cleaned easily using the manual washing function

⑦

Machine unit (standard specifications)

Model		EA12VM ADVANCE
Machine unit	Dimensions (W x D x H)	1750 x 2050 x 2335 (68.9 x 80.7 x 91.9) [mm (in)]
	Total system weight	3725 (8195) [kg (lb.)]
Axis stroke	(X x Y x Z)	400 x 300 x 300 (15.7 x 11.8 x 11.8) [mm (in)]
Spindle	Distance between table and electrode mounting surface	270 to 570 (10.6 to 22.4) [mm (in)]
	Max. electrode weight	50 (110) [kg (lb.)]
Working tank	Method	Automatic elevation tank
	Inner dimensions (W x D x H)	850 x 600 x 350 (33.5 x 23.6 x 13.8) [mm (in)]
	Fluid level adjustment range (from top of table)	100 to 300 (3.9 to 11.8) [mm (in)]
Table	Dimensions (W x D)	700 × 500 (27.6 × 19.7) [mm (in)]
	Max. workpiece dimensions (W x D x H)	800 x 550 x 250 (31.5 x 21.7 x 9.8) [mm (in)]
	Max. loading weight	700 (1540) [kg (lb.)]
	T-slot	Three slots at 12-160 pitch
Dielectric fluid reservoir	Capacity (initial dielectric fluid supply amount)	340 (90) (400 (106)) [ℓ (gal.)]
	Filtering method	Two fine paper filters
	Dielectric fluid temperature control unit	Unit cooler

Distance between table and electrode mounting surface

		3R-MACRO	EROWA	3R-Combi	
				MACRO	Jr
C-axis	[mm (in)]	135 to 435 (5.3 to 17.1)	152.5 to 452.5 (6.0 to 17.8)	135 to 435 (5.3 to 17.1)	145 to 445 (5.7 to 17.5)
Spindle	[mm (in)]	181 to 481 (7.1 to 18.9)	198.5 to 498.5 (7.8 to 19.6)	181 to 481 (7.1 to 18.9)	191 to 491 (7.5 to 19.3)
Automatic clamp	[mm (in)]	198 to 498 (7.8 to 19.6)	207.5 to 507.5 (8.2 to 20.0)	198 to 498 (7.8 to 19.6)	208 to 508 (8.2 to 20.0)

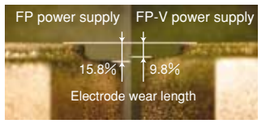
①

Advance control unit

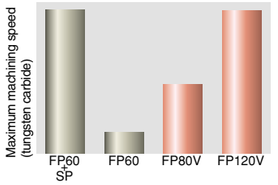
②

Utilizing 3D CAD data

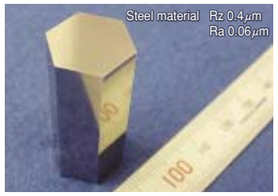
③



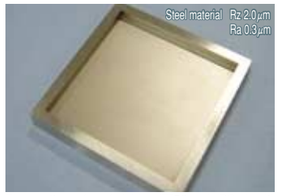
Electrode wear during tungsten carbide die machining



④

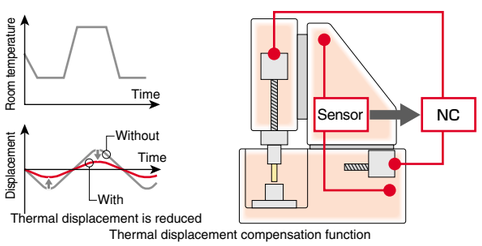


Glossy mirror finishing (GM2 circuit)



Fine matte surface finishing (□50mm) (PS circuit)

⑤



Thermal displacement is reduced

Thermal displacement compensation function

⑥

Automatic elevation tank

Fluid circulation function

C-axis/ATC (option)

				3R		EROWA	
				MACRO	Combi	ITS	COMBI
C-axis		Max. electrode weight	50 (110) (Note 1) [kg (lb.)]	○	○	○	○
		Speed	1 to 30 [min-1]				
	Spindle	Max. electrode weight	10 (22) (Note 1) [kg (lb.)]	○	○	○	○
		Speed	1 to 1500 [min-1]				
ATC	MVH 20T	Max. electrode dimensions	70 x 70 x 150 (2.8 x 2.8 x 5.9) [mm (in)]	○	○	○	(Note 3)
		Max. electrode weight	10kg (22lb.)/electrode Magazine total: 80kg (176lb.) (Note 2)				
	MVH 40T	Max. electrode dimensions	70 x 70 x 150 (2.8 x 2.8 x 5.9) [mm (in)]	○	○	○	(Note 3)
		Max. electrode weight	5kg (11lb.)/electrode Magazine total: 40kg (88lb.) (Note 2, 4)				

(Note 1) For MACRO Jr of 3R-Combi and Compact of EROWA-COMBI, the weight is 2.5kg (5lb.) /electrode.
(Note 2) For MACRO of 3R-Combi, the weight is 5kg (11lb.)/ electrode, and is 2.5kg (5lb.)/ electrode with MACRO Jr. In both cases, the magazine total is 40kg (88lb.).
(Note 3) ATC can be used with EROWA ITS50, but not with EROWA Compact (manual only).
(Note 4) Tolerable electrode weight specifications of 10kg (22lb.)/ electrode (magazine total: 80kg (176lb.)) are also available with the MVH40T-ATC.

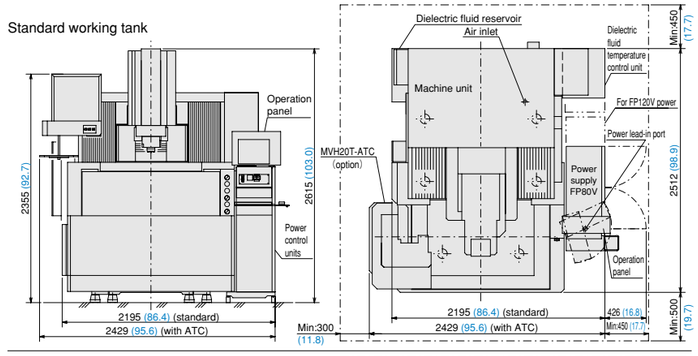
EA28V Advance

New High-speed, High-accuracy Medium-sized Model with Outstanding Operation and Maintenance Performance

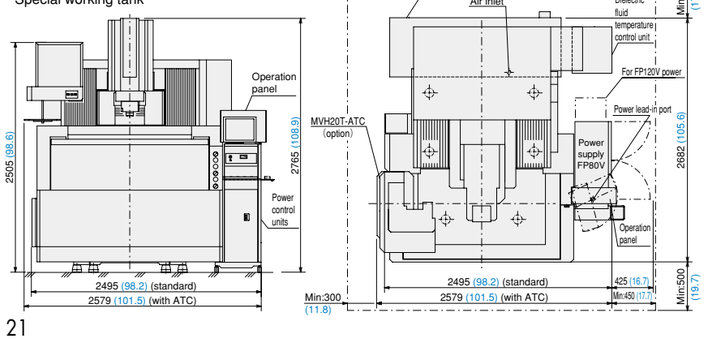
High-performance die-sinking EDM with FP-V power supply

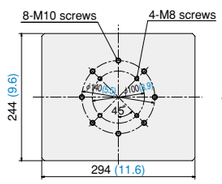
Working tank inner dimensions	: 1100x810x450mm (43.3x31.9x17.7")
Stroke	: 650x450x350mm (25.6x17.7x13.8")
Machine unit dimensions	: 2195x2512x2615mm (86.4x98.9x103.0")
System total weight	: 5400kg (11880lb.)
Dielectric fluid reservoir capacity	: 390 ℓ (103gal.)

Standard working tank



Special working tank





(Unit: mm (in))

* The 3R/ EROWA electrode holder is used when the built-in C-axis/ automatic clamp (option) is provided.

Electrode mounting table dimension drawing

Standard functions

- Tungsten carbide machining circuit
- Fine matte finish circuit (PS circuit)
- Glossy mirror finish circuit (GM2 circuit)
- Narrow gap circuit
- Thermal displacement compensation system
- Z-axis linear scale
- High-accuracy positioning circuit
- Multi-position working tank
- Working tank fluid flow adjustment function
- High-function manual operation box
- LAN

Option

- Column up 150mm (5.9in) specifications
- Highly rigid built-in C-axis
- High-accuracy built-in spindle
- Large electrode adaptor
- MVH20T/40T-ATC
- NS powder specifications
- XY-axis linear scale
- Z-axis stroke 450 specifications
- Emission/suction automatic changeover
- Programmable flushing nozzle (eight nozzles) + Automatic changeover
- Fluid pressure 3-step changeover
- Dielectric fluid distributor
- Special working tank (including 150mm (5.9in) column up)
- FP120V
- GF2 control

Standard delivery entrance

	Width [mm (in)]	Height [mm (in)]
Standard specifications	2063 (81.2)	2660 (104.7)
MVH20T-ATC specifications	2297 (90.4)	2660 (104.7)
MVH40T-ATC specifications (Note 1)	2168 (85.4)	2660 (104.7)

(Note 1) With the MVH40T-ATC specifications, the ATC unit and holder are removed before shipment. A crane or lifting device is required when installing the system.

Outstanding operability ①

- 15-inch LCD touch panel
- Easy-to-use menu configuration
- Machining conditions search (shape expert)

Utilizing CAD data ②

- Machining instruction information (EPX) can be read from CAD/CAM
- 3D data (Parasolid) can be read in
- Area changes can be calculated from 3D model to optimize machining conditions (3D-EXPERT)

New high-speed FP-V power supply ③

- Finishing performance and tungsten carbide machining performance equal to the EA12V Advance
- Optimized machining technology enables low-wear machining with graphite electrode
- FP120V power supply is suitable for high-speed rough machining of graphite (option)

High-rigidity and high-accuracy technology ④

- Machining stability is improved by increasing the machine structure's rigidity
- Mitsubishi Electric original thermal displacement compensation function and semi-cabin structure are adopted
- Standard linear scale on Z-axis
- Machine temperature fluctuation suppressed to a minimum with fluid circulation function

Outstanding operability ⑤

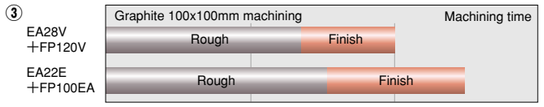
- The three-sided drop tank improves access for work set-up (with working tank multi-position function)
- Working tank fluid high-flow rate mode compatible with medium to large graphite machining
- Standard high-function manual operation box with coordinate display
- Easy workpiece loading using hand lifter
- Machine zero point position at center of the XY-axes stroke corresponding to medium to large electrodes

Advanced machining control ⑥

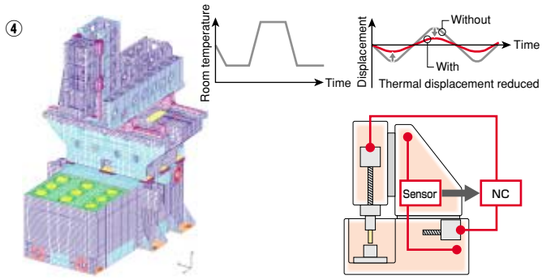
- Machine medium-to large-sized workpieces or deep ribs with advanced SS Jump 3
- Adjustable high-volume fluid flow rates increase the range of no-flush machining
- Machining performance using graphite electrodes improved with GF2 control (option)
  Greatly improve machining speed for rib shapes and electrode wear in formed mold shapes

① ② Advance control unit / Utilizing 3D CAD data

③

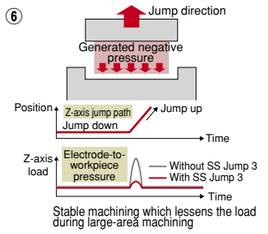


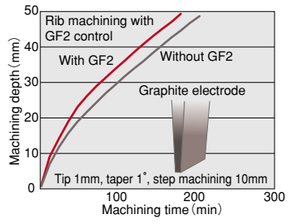
④ Thermal displacement compensation function



⑤ Automatic elevation tank Fluid circulation function / Workpiece coordinates can be set from the advanced manual control box.

⑥ Stable machining which lessens the load during large-area machining





Machine unit (standard specifications)

		EA28VM ADVANCE
Machine unit	Dimensions (W x D x H)	2195 x 2512 x 2615 (86.4 x 98.9 x 103.0) 〈2495 x 2682 x 2765〉 (98.2 x 105.6 x 108.9) [mm (in)]
	Total system weight	5400 (11880) 〈5900 (12980)〉 [kg (lb.)]
Axis stroke	(X x Y x Z)	650 x 450 x 350 (25.6 x 17.7 x 13.8) [mm (in)]
Spindle	Distance between table and electrode mounting surface	425 to 775 (16.7 to 30.5) (With standard electrode and table) 〈575 to 925〉 (22.6 to 36.4) (With standard electrode and table) [mm (in)]
	Max. electrode weight	200 (440) (With standard electrode and table) [kg (lb.)]
Working tank	Method	Automatic elevation tank
	Inner dimensions (W x D x H)	1100 x 810 x 450 (43.3 x 31.9 x 17.7) 〈1400 x 900 x 550〉 (55.1 x 35.4 x 19.7) [mm (in)]
	Fluid level adjustment range (from top of table)	100 to 400 (3.9 to 15.7) 〈150 to 500 (5.9 to 19.7)〉 [mm (in)]
Table	Dimensions (W x D)	850 x 600 (33.5 x 23.6) [mm (in)]
	Max. workpiece dimensions (W x D x H)	1050 x 760 x 350 (41.3 x 29.9 x 13.8) 〈1350 x 850 x 450〉 (53.1 x 33.5 x 17.7) [mm (in)]
	Max. loading weight	2000 (4400) [kg (lb.)]
	T-slot	Three slots at 14-200 pitch
Dielectric fluid reservoir	Capacity (initial dielectric fluid supply amount)	390 (103) 〈595 (157)〉 〈560 (148) 〈890 (235)〉〉 [ℓ (gal.)]
	Filtering method	Three fine paper filters
	Dielectric fluid temperature control unit	Unit cooler

Specifications for special working tank are given in parentheses.

Distance between table and electrode mounting surface

		3R-MACRO	EROWA	3R-Combi MACRO	3R-Combi Jr
C-axis	[mm (in)]	300 to 650 (11.8 to 25.6)	317.5 to 667.5 (12.5 to 26.3)	300 to 650 (11.8 to 25.6)	310 to 660 (12.2 to 26.0)
Spindle	[mm (in)]	279 to 629 (11.0 to 24.8)	296.5 to 646.5 (11.7 to 25.5)	279 to 629 (11.0 to 24.8)	289 to 639 (11.4 to 25.2)
Automatic clamp	[mm (in)]	300 to 650 (11.8 to 25.6)	309.5 to 659.5 (12.2 to 26.0)	300 to 650 (11.8 to 25.6)	310 to 660 (12.2 to 26.0)

C-axis/ATC (option)

				3R		EROWA	
				MACRO	Combi	ITS	COMBI
C-axis		Max. electrode weight	50 (110) (Note 1) [kg (lb.)]	○	○	○	○
		Speed	1 to 30 [min-1]				
	Spindle	Max. electrode weight	10 (22) (Note 1) [kg (lb.)]	○	○	○	○
		Speed	1 to 1500 [min-1]				
ATC	MVH 20T	Max. electrode dimensions	70 x 70 x 200 (2.8 x 2.8 x 7.9) [mm (in)] (Note 5)	○	○	○	(Note 3)
		Max. electrode weight	10kg (22lb.)/electrode Magazine total: 80kg (176lb.) (Note 2)				
	MVH 40T	Max. electrode dimensions	70 x 70 x 200 (2.8 x 2.8 x 7.9) [mm (in)] (Note 6)	○	○	○	(Note 3)
		Max. electrode weight	5kg (11lb.)/electrode Magazine total: 40kg (88lb.) (Note 2, 4)				

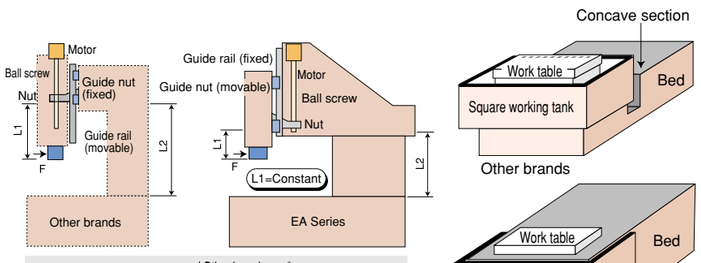
(Note 1) For MACRO Jr of 3R-Combi and Compact of EROWA-COMBI, the weight is 2.5kg (5lb.) /electrode.
(Note 2) MACRO of 3R-Combi, the weight is 5kg (11lb.)/ electrode, and is 2.5kg (5lb.)/ electrode with MACRO Jr. In both cases, the magazine total is 40kg (88lb.).
(Note 3) ATC can be used with EROWA ITS50, but not with EROWA Compact (manual only).
(Note 4) Tolerable electrode weight specifications of 10kg (22lb.)/ electrode (magazine total: 80kg (176lb.)) are also available with the MVH40T-ATC.
(Note 5) Contact your local Mitsubishi Electric sales or dealer if the electrode exceeds the specified dimensions.
(Note 6) MVH40T-ATC, electrodes exceeding the specified dimensions cannot be mounted even if space is provided in the magazine because there will be interference with the machine.

Refined Style, High-performance, Energy-saving Power Supply, Ample Know-how

Machine

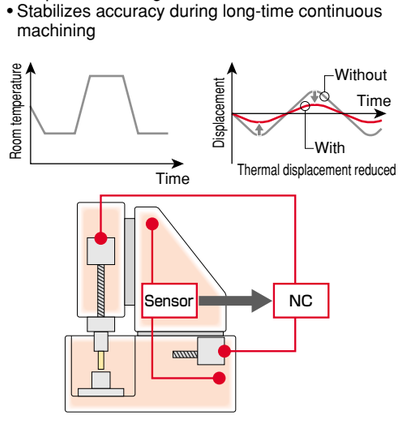
Highly rigid machine structure (EA Series)

- Highly rigid Z-axis enabled with low head structure
- Outstanding servo Z-axis design achieved using direct drive method
- Highly rigid integrated bed structure with no indentation (concave sections)



Thermal displacement compensation function〈EA30/40/50〉

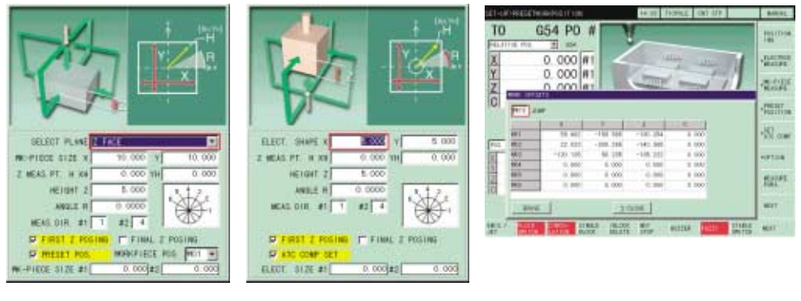
- Reduces thermal displacement caused by temperature changes
- Stabilizes accuracy during long-time continuous machining



Set-up

Powerful measurement and positioning functions

- Ample electrode and workpiece measurement patterns
- Easy positioning and presetting
- Workpiece coordinate system compatible with multiple workpieces



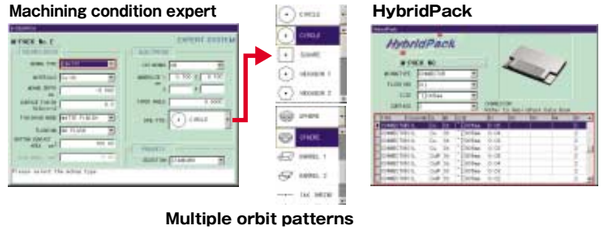
Program

E.S.P.E.R Ⅱ

- Easy programming Format method
- Complicated machining programs well supported
- Compatible with multiple electrodes and multiple set-up machining

Machining condition search

- Consolidation of years of machining know-how
- Easy-to-use search methods
- Machining technology developed with user



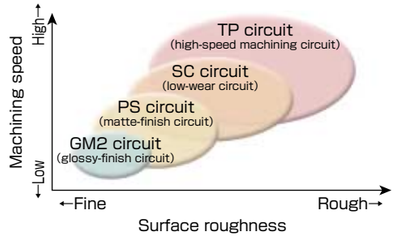
Machining

FPⅡ power supply

- Power consumed that does not contribute to machining is greatly reduced

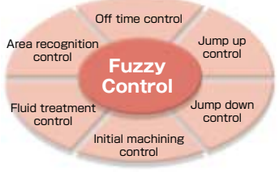
Machining circuit

- Optimum machining for detailed workpieces is possible



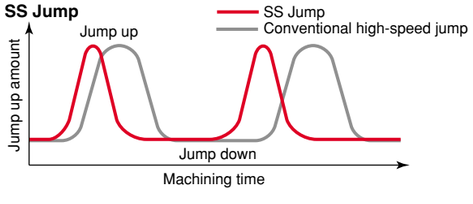
Fuzzy Pro Plus

- Constantly monitors the machining state
- Automatically adjusts to optimum conditions according to the machining state
- Enables high-speed machining during deep machining



Jump control

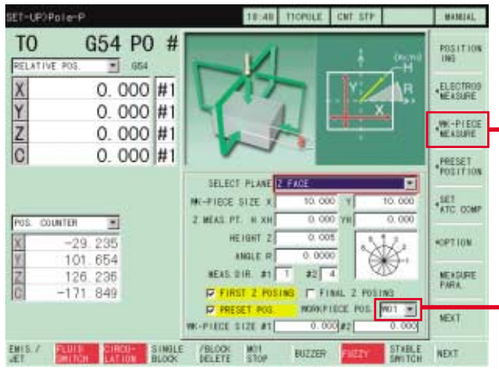
- Machine vibration when jumping is suppressed, allowing stable machining even in large areas



64-bit Control Function (MA2000,EA,VA Series)

Workpiece set-up

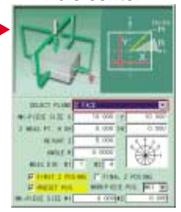
Workpiece measurement



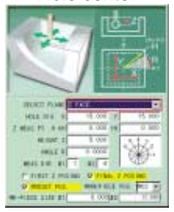
Ample workpiece measurement functions

- Workpiece can be measured easily simply by inputting the required items

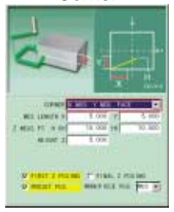
Pole center



Hole center



Corner



Coordinate preset function

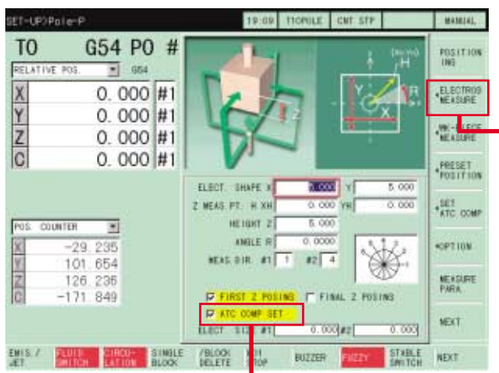
- The coordinates for various workpieces can be set easily (max. 106)

Various parameters for measurement

- The parameters required for measurement can be set

Electrode set-up

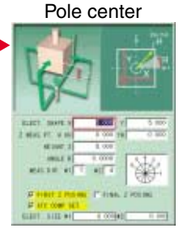
Electrode measurement



Ample electrode measurement functions

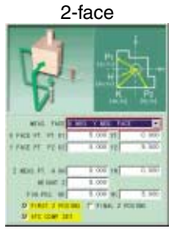
- Electrode can be measured easily simply by inputting the required items

Pole center



Hole center

2-face

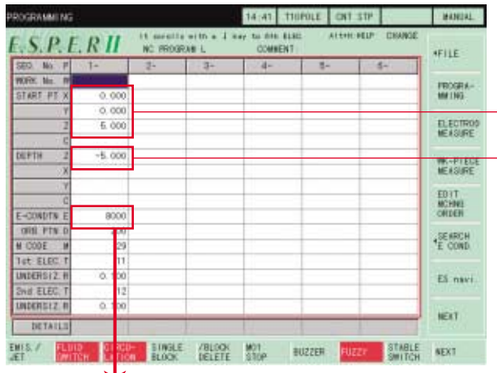


Electrode alignment setting function

- Set the electrode core alignment when using multiple electrodes

Machining program creation

Machining programming tool E.S.P.E.R II



Create programs with easy inputs

- Programs can be created easily by inputting the required fields in a matrix format

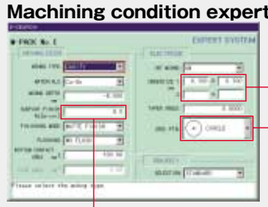
Machining position input

Machining depth input

Machining condition selection and search

- Machining conditions can be selected simply by inputting each setting field on an interactive screen

Machining condition expert

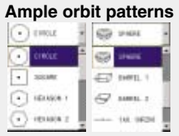


Electrode undersize input

Orbit pattern

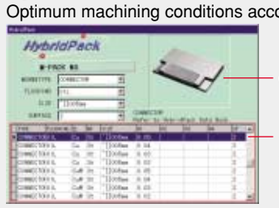
Surface roughness input

Ample orbit patterns



HybridPack

Optimum machining conditions according to application



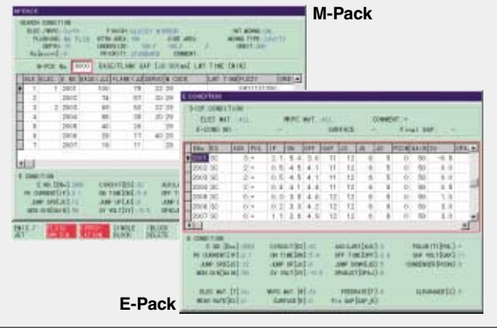
Graphic display of details

HybridPack registration screen

- Automatically set machining conditions from rough to finish with machining condition search

M-Pack

E-Pack

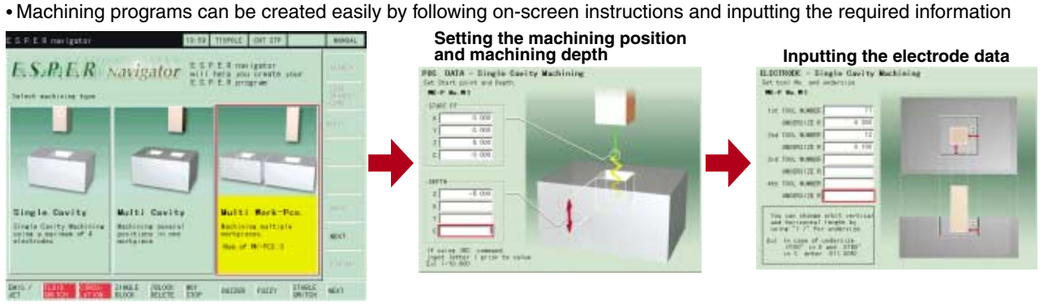


Download from the support website (DIAX-NET.COM) http://www.diax-net.com/

- Registered members can download latest machining conditions free of charge

E.S.P.E.R Navigator

- Machining programs can be created easily by following on-screen instructions and inputting the required information



MA2000

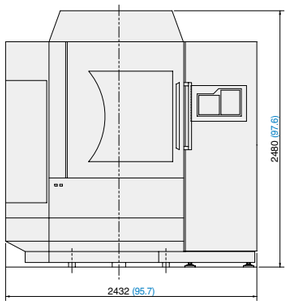
Flagship EDM Model Combining Advanced Technologies

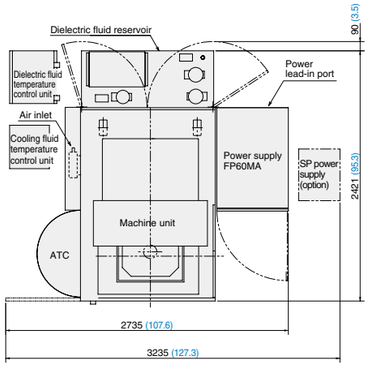
MVH40T-ATC (option)

Machining accuracy ±0.002mm (0.00008") achieved (Note 1)
Ultrahigh-accuracy die-sinking EDM

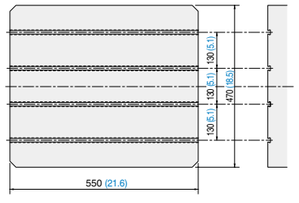
(Note 1) The machining accuracy follows the Mitsubishi Electric machining conditions.

Working tank inner dimensions	: 650x500x340mm (25.5x19.6x13.3")
Stroke	: 400x300x300mm (15.7x11.8x11.8")
Machine unit dimensions	: 2432x2421mm (95.7x95.3")
System total weight	: 6000kg (13000lb.)
Dielectric fluid reservoir capacity	: 390 ℓ (100gal.)





(Unit: mm (in))



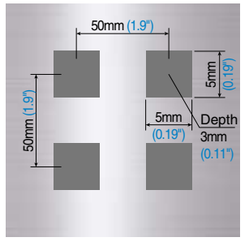
Granite table (upper surface) dimension drawing

Standard delivery entrance

	Width[mm (in)]	Height[mm (in)]
Standard specifications	2500 (98.4)	2600 (102.3)
MVH40T-ATC specifications (Note 2)	2500 (98.4)	2600 (102.3)

(Note 2) With the MVH40T-ATC specifications, the ATC unit and ATC cabin cover are removed before shipment. A crane and assembly work are required when installing the system.

Mitsubishi Electric machining conditions (example of pitch machining accuracy)



Workpiece SKD61: four copper electrodes
Room temperature during machining: 20±1°C

Standard functions

- Highly rigid built-in C-axis
- LS20T-ATC specifications
- Ultrafine matte finish circuit (NP2 circuit)
- Fine matte finish circuit (PS circuit)
- Glossy mirror finish circuit (GM2 circuit)
- Thermal displacement compensation system
- XYZ-axis linear scale
- High-accuracy positioning circuit
- LAN

Options

- Programmable flushing nozzle section (six nozzles) + Automatic changeover
- SP power supply (power supply for tungsten carbide machining)
- High-accuracy built-in spindle
- MVH40T-ATC
- Lighting
- Dielectric fluid distributor

Temperature control technology for high-accuracy machining ①

- Full-cabin structure shuts out the effect of external temperature fluctuation
- EDM's general temperature is constantly controlled with fluid circulation
- Mitsubishi Electric original high-accuracy thermal displacement compensation function is added

Highly rigid C-axis ②

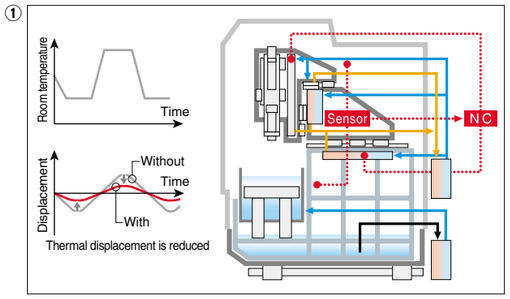
- Highly rigid C-axis realizes stable machining
- Highly accurate helical machining and index machining are possible
- High-accuracy built-in spindle (option) is also available

Servo control technology providing both accuracy and speed ③

- Highly rigid roller guide is adopted for the X, Y and Z axes
- X, Y and Z axes are equipped with an absolute value linear scale as standard equipment
- Perfect for high-accuracy pitch machining

Long continuous machine operation with automation ④

- Machine specifications are suitable for high-accuracy continuous machining
- Machine operation rate is improved with long automatic operation
- Operation can easily be sequenced with peripheral equipment such as an ATC and workpiece changer

① 

②

Helical gear machining

③

Step machining (1 μm step)

④

MA2000 + FA20PS + WorkMaster (System3R)

Machine unit (standard specifications)

Model		MA2000M
Machine unit	Dimensions (W x D x H)	2432 x 2421 x 2480 (95.7 x 95.3 x 97.6) [mm (in)]
	Total system weight	6000 (13000) [kg (lb.)]
Axis stroke	(X x Y x Z)	400 x 300 x 300 (15.7 x 11.8 x 11.8) [mm (in)]
Spindle	Distance between table and electrode mounting surface	153 to 453(3R-MACRO) (6.0 x 17.8) [mm (in)]
	Max. electrode weight	50 (110) [kg (lb.)]
Working tank	Method	Automatic elevation
	Inner dimensions (W x D x H)	650 x 500 x 340 (25.5 x 19.6 x 13.3) [mm (in)]
	Fluid level adjustment range (from top of table)	100 to 300(3.9 x 11.8) [mm (in)]
Table (granite)	Dimensions (W x D)	550 x 470 (21.6 x 18.5) [mm (in)]
	Max. workpiece dimensions (W x D x H)	600 x 450 x 250 (23.6 x 17.7 x 9.8) [mm (in)]
	Max. loading weight	700 (1540) [kg (lb.)]
	T-slot	Four slots at 13-130 pitch
Dielectric fluid reservoir	Capacity	390 (100) [ℓ (gal.)]
	Filtering method	One fine paper filter
	Dielectric fluid temperature control unit	Unit cooler

Distance between table and electrode mounting surface

		3R-MACRO	EROWA
C-axis	[mm (in)]	153 to 453 (6.0 to 17.8)	170 to 470 (6.6 to 18.5)
Spindle	[mm (in)]	134 to 434 (5.2 to 17.0)	151 to 451 (5.9 to 17.7)

C-axis/ATC (standard specifications)

				3R		EROWA	
				MACRO	Combi	ITS	COMBI
C-axis		Max. electrode weight	50 (110) [kg (lb.)]	○	—	○	—
		Speed	10, 20 [min-1]				
ATC	LS 20T	Max. electrode dimensions	70 x 70 x 200 (2.8 x 2.8 x 7.9) [mm (in)]	○	—	○	—
		Max. electrode weight	10kg (22lb.)/ electrode Magazine total: 40kg (88lb.)				

C-axis/ATC (option)

				3R		EROWA	
				MACRO	Combi	ITS	COMBI
C-axis spindle		Max. electrode weight	30 (66) [kg (lb.)]	○	—	○	—
		Speed	1 to 1500 [min-1]				
ATC	MVH 40T	Max. electrode dimensions	70 x 70 x 200 (2.7x 2.7 x 7.8) [mm (in)]	○	—	○	—
		Max. electrode weight	5kg (11lb.)/ electrode Magazine total: 40 kg (88lb.) (Note 3)				

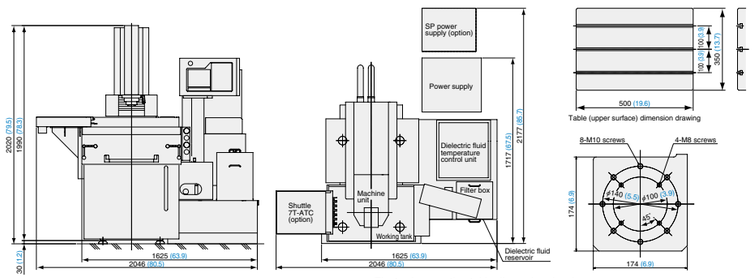
(Note 3) Tolerable electrode weight specifications of 10kg (22lb.)/ electrode (magazine total: 80kg (176lb.)) are also available with the MVH40T-ATC.

EA8 / EA12D

Powerful Functions in a Compact Body

A standard EDM with high productivity and cost performance

EA8



Electrode mounting table dimension drawing

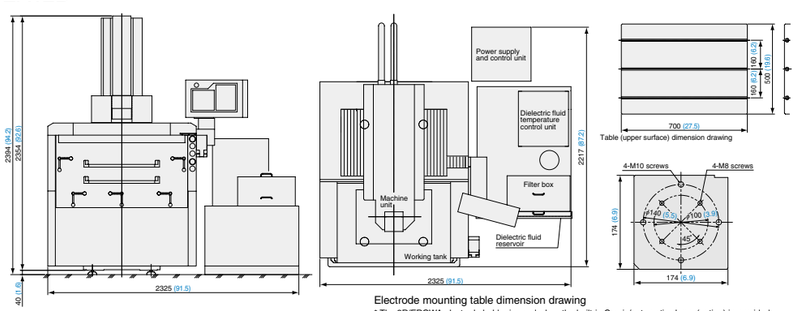
* The 3R/EROWA electrode holder is used when the built-in C-axis/automatic clamp (option) is provided.

(Unit: mm (in))

Standard functions
- Fine matte finish circuit (PS circuit)
- Glossy mirror finish circuit (GM2 circuit)
- Dielectric fluid temperature control unit

Options
- Built-in C-axis
- Automatic dielectric fluid supply/drain (EA8)
- Programmable flushing nozzle (eight nozzles) + Automatic changeover (EA8)
- SP power supply (power supply for tungsten carbide machining)
- Advanced manual control box
- Lighting
- Dielectric fluid distributor

EA12D



Electrode mounting table dimension drawing

* The 3R/EROWA electrode holder is used when the built-in C-axis/automatic clamp (option) is provided.

Standard delivery entrance (EA8)

	Width [mm (in)]	Height [mm (in)]
Standard specifications	1252 (49.2)	2150 (84.6)
Shuttle 4T-ATC specifications	1502 (59.1)	2150 (84.6)
Shuttle 7T-ATC specifications	1673 (65.8)	2150 (84.6)

Standard delivery entrance (EA12D)

	Width [mm (in)]	Height [mm (in)]
Standard specifications	1650 (64.9)	2524 (99.3)
Shuttle 4T-ATC specifications	1888 (74.3)	2524 (99.3)
Shuttle 7T-ATC specifications	1888 (74.3)	2524 (99.3)

FPII power supply —①

- Standard low-wear machining circuit and finishing circuit
- High-grade finishing, suitable for die machining, is possible
- Energy-saving specifications incorporate no-resistance method

Highly accurate and rigid machine structure —②

- Highly rigid structure has low head
- Highly rigid bed structure has no concave section
- An optimum design and compact body have been attained using CAE structure analysis

Fuzzy adaptive control —③

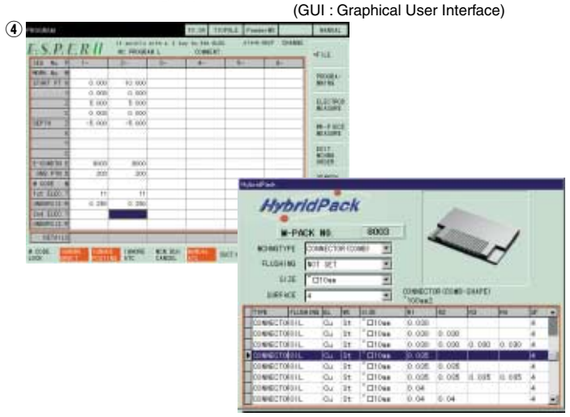
- Machining conditions are optimally controlled to match the machining state
- Stable machining is realized with SS jump
- Optimum machining according to the flushing method (no-flush, emission, fluid jet, suction) is possible

Improved workability with GUI —④

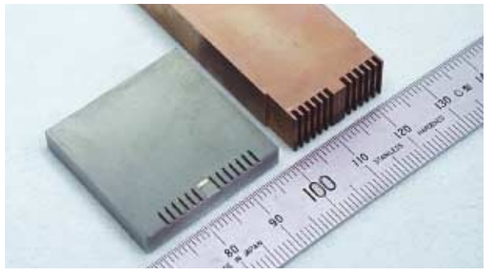
- Dedicated language is not required for any process from set-up to machining
- Navigation method allows even beginners to operate easily
- Various machining applications are possible with the HybridPack

(GUI : Graphical User Interface)

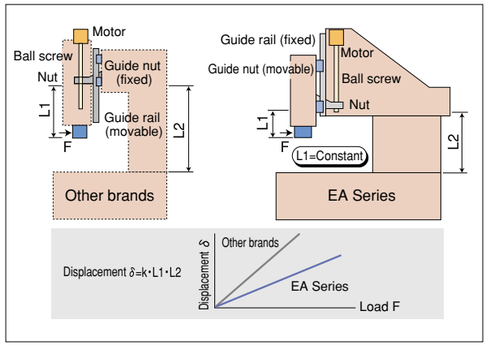
④



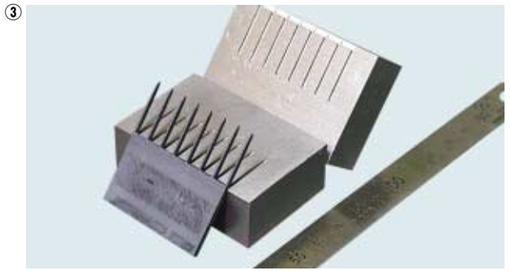
①



②



③



Machine unit (standard specifications)

Model		EA8M	EA12DM	
Machine unit	Dimensions (W x D x H)	1625 x 1717 x 2000 (63.9 x 67.5 x 78.7)	1840 x 1960 x 2375 (72.4 x 77.1 x 93.5)	[mm (in)]
	Total system weight	2000 (4400)	2900 (6300)	[kg (lb.)]
Axis stroke (X x Y x Z)		300 x 250 x 250 (11.8 x 9.8 x 9.8)	400 x 300 x 300 (15.7 x 11.8 x 11.8)	[mm (in)]
Spindle	Distance between table and electrode mounting surface	200 to 450 (7.8 x 17.7)	300 to 600 (11.8 x 23.6)	[mm (in)]
	Max. electrode weight	25 (55)	50 (110)	[kg (lb.)]
Working tank	Method	Vertical front door		
	Internal dimensions (W x D x H)	770 x 500 x 250 (30.3 x 19.6 x 9.8)	1050 x 700 x 450 (41.3 x 27.5 x 17.7)	[mm (in)]
	Fluid level adjustment range (from top of table)	110 to 200 (4.3 x 7.8)	180 to 400 (7.0 x 15.7)	[mm (in)]
Table	Dimensions (W x D)	500 x 350 (19.6 x 13.7)	700 x 500 (27.5 x 19.6)	[mm (in)]
	Max. workpiece dimensions (W x D x H)	740 x 470 x 150 (29.1 x 18.5 x 5.9)	1000 x 650 x 350 (39.3 x 25.5 x 13.7)	[mm (in)]
	Max. loading weight	550 (1200)	1000 (2200)	[kg (lb.)]
	T-slot	Three slots at 12-100 pitch	Three slots at 12-160 pitch	
Dielectric fluid reservoir	Capacity	196 (51)	500 (132)	[ℓ (gal.)]
	Filtering method	One paper filter		
	Dielectric fluid temperature control unit	Fan cooler	Unit cooler	

C-axis/ATC (option)

				3R		EROWA	
				MACRO	COMBI	ITS	COMBI
C-axis		Max. electrode weight	10 (22) (Note 1) [kg (lb.)]	○	○	○	○
		Speed	10, 20 [min-1]				
ATC	Shuttle 4T	Max. electrode dimensions	70 x 70 x 100 (2.7 x 2.7 x 3.9) [mm (in)]	○	—	○	(Note3)
		Max. electrode weight	5kg (11lb.)/ electrode Magazine total: 20kg (44lb.)				
	Shuttle 7T	Max. electrode dimensions	35 x 35 x 100 (1.3 x 1.3 x 3.9) (Note 2) [mm (in)]	○	○	—	—
		Max. electrode weight	2.5kg (5lb.) /electrode Magazine total: 10kg (22lb.)				

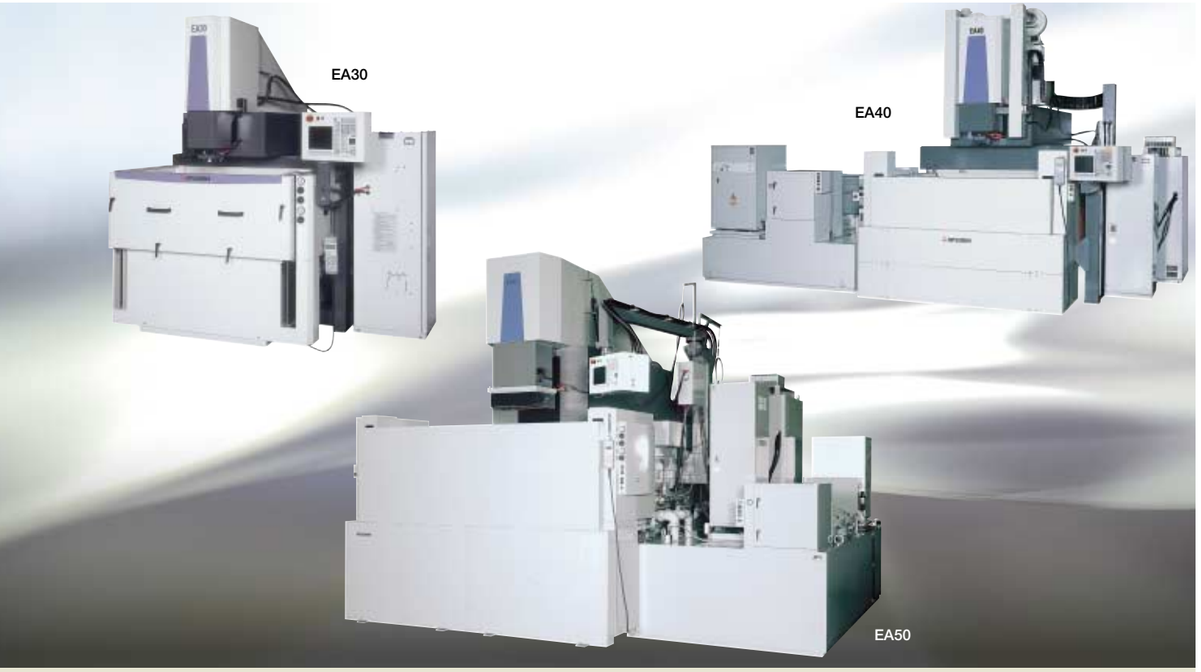
(Note 1) For MACRO Jr of 3R-Combi and Compact of EROWA-COMBI, the weight is 2.5kg (5lb.)/ electrode.
(Note 2) When using four electrodes, the dimensions are 70 x 70 x 100(mm) 2.7 x 2.7 x 3.9(in).
The magazine total is 10kg (22lb.).
(Note 3) ATC can be used with EROWA ITS50, but not with EROWA Compact (manual only).

Distance between table and electrode mounting surface

		MACRO	EROWA	3R-COMBI	
				MACRO	Jr
EA8 [mm (in)]	C-axis	178 to 428 7.0 to 16.8	182.5 to 432.5 7.1 to 17.0	170 to 420 6.6 to 16.5	180 to 430 7.0 to 16.9
EA12D [mm (in)]		278 to 578 10.9 to 22.7	287 to 587 11.2 to 23.1	271 to 571 10.6 to 22.4	281 to 581 11.0 to 22.8

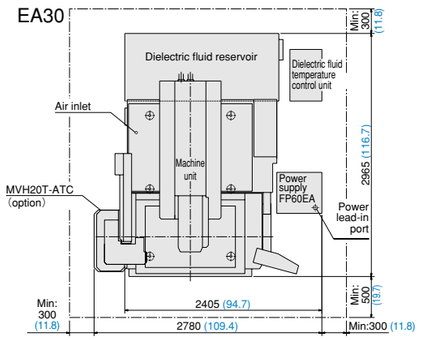
EA30 / EA40 / EA50

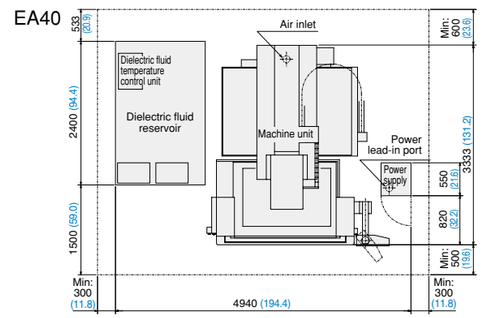
Diverse Line-up for Machining Large Workpieces

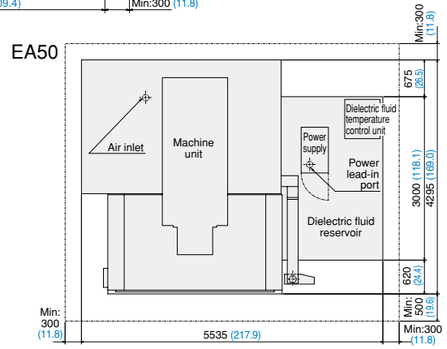


Large working tank and large fixed table for machining large workpieces

The EA40/50 machine photos are shown with the built-in C-axis, automatic filter system and booster power supply options.







(Unit: mm (in))

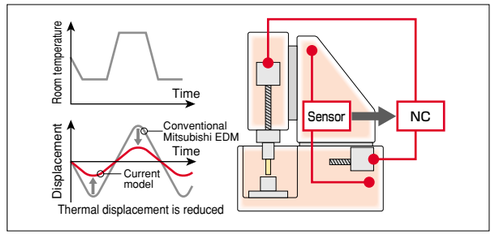
Options

- Built-in C-axis
- Automatic tool changer (Note 1)
- Automatic filter system
- Booster power supply
- Programmable flushing nozzle section (eight nozzles) + automatic changeover
- Lighting
- Dielectric fluid distributor
- Special working tank
- Large electrode adaptor (for built-in C-axis)
- Maximum electrode weight 500kg (1100lb.) specifications (EA40)

(Note 1) Contact your Mitsubishi Electric sales office or dealer for details on the EA40 and EA50 ATC.

Thermal displacement compensation function (EA30/EA40/EA50)

- Temperature sensors constantly monitor changes in the environment
- Axes are controlled in real-time based on changes in temperature
- Highly accurate machining, less affected by the work environment, is possible



Automatic vertical front door (EA40/EA50)

The working tank door opens and closes automatically when a button is pressed. In addition, work safety and operability are enhanced as the front door's clamp is automatically latched.

Machine unit (Standard specifications)

Model		EA30M	EA40M	EA50M	
Machine unit	Machine unit dimensions (W x D x H)	2520 x 3055 x 2495 (99.2 x 120.3 x 98.2)	3050 x 3633 x 3140 (120.0 x 143.0 x 123.6)	4280 x 4295 x 4100 (168.5 x 169.0 x 161.4)	[mm (in)]
	Machine unit weight	6860 (15100)	12000 (26000)	20000 (44000)	[kg (lb.)]
Axis stroke	Machining stroke (X x Y x Z)	700 x 500 x 350 (27.6 x 19.7 x 9.8)	1000 x 600 x 450 (39.3 x 23.6 x 17.7)	1500 x 600 x 600 (59.0 x 23.6 x 23.6)	[mm (in)]
	Extra stroke for workpiece loading	None	None	X-axis left 600 (23.6)	[mm (in)]
Spindle	Distance between table and electrode surfaces mounting surface.	300 to 650 (11.8 to 25.6)	450 to 900 (17.7 to 35.4)	500 to 1100 (19.6 to 43.3)	[mm (in)]
	Max. electrode weight	200 (440)	300 (660) (500 (1100))(Note 1)	500 (1100)	[kg (lb.)]
Working tank	Working tank internal dimensions (standard)	1280 x 850 x 450 (50.4 x 33.5 x 17.7) (XK140A)	1600 x 1100 x 500 (62.9 x 43.3 x 19.6) (XK170)	2500 x 1600 x 850 (98.4 x 62.9 x 33.4) (XK270)	[mm (in)]
	Fluid level adjustment range (from top of table)	190 to 400 (7.5 to 15.7)	200 to 450 (7.8 to 17.7)	400 to 800 (15.7 to 31.4)	[mm (in)]
Table	Table dimensions	1100 x 750 (43.3 x 29.5)	1400 x 950 (55.1 x 37.4)	2000 x 1350 (78.7 x 53.1)	[mm (in)]
	Max. workpiece dimensions (reference)	1230 x 800 x 350 (48.4 x 31.5 x 13.8)	1500 x 1000 x 400 (59.0 x 39.3 x 15.7)	2400 x 1500 x 750 (94.4 x 59.0 x 29.5)	[mm (in)]
	Max. loadable workpiece weight	2000 (4400)	5000 (11000)	10000 (22000)	[kg (lb.)]
	T-slot	Four slots at 14-180 pitch	Five slots at 14-200 pitch	Seven slots at 14-200 pitch	
Dielectric fluid reservoir	Capacity	800 (210)	1900 (500)	5200 (1370)	[ℓ (gal.)]
	Filtering method	One paper filter	Two paper filters	Four paper filters	
	Dielectric fluid temperature control unit	Unit cooler	Unit cooler	Unit cooler	
Standard functions	Thermal displacement compensation function	Standard	Standard	Standard	
	Operation panel	Pendant with fixed arm	Pendant with fixed arm	Pendant with turning arm	
	Manual operation box	High-function manual operation box	High-function manual operation box	High-function manual operation box	
	Automatic dielectric fluid supply/ drain	Standard	Standard	Standard	
	Automatic open/close working tank door	Vertical front door	Automatic vertical front door	Automatic vertical front door	

(Note 1) The maximum electrode weight 500kg (227.0lb.) specifications are available as an option for the EA40.
(Note 2) For large models, the installation site floor must be sufficiently thick.

Special working tank (option)

In addition to the standard working tanks above, the following special working tanks are available for the EA30/EA40/EA50.

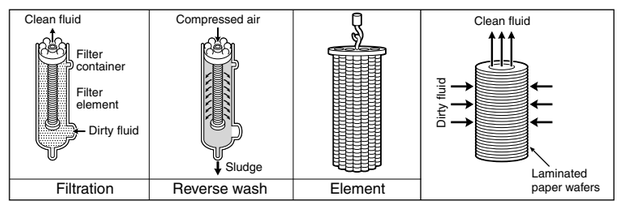
Model	Working tank	Inner dimensions [mm (in)]	Max. workpiece dimensions [mm (in)]	Table electrode mounting surface distance [mm (in)]	Fluid level adjustment range [mm (in)]	Required column up [mm (in)]	Door method	Dielectric fluid reservoir capacity	Remarks
EA30M	XK141A	1280 x 850 x 550 (50.4 x 33.5 x 21.7)	1230 x 800 x 450 (48.4 x 31.5 x 17.7)	400 to 750 (15.7 to 29.5)	240 to 500 (9.4 to 19.7)	100 (3.9)	Hinged open/close method	T80A (800 ℓ) (211gal.)	Dummy workpiece 50L
	XK150AS	1400 x 950 x 700 (55.1 x 37.4 x 27.6)	1350 x 900 x 600 (53.1 x 35.4 x 23.6)	550 to 900 (21.7 to 35.4)	315 to 650 (12.4 to 25.6)	250 (9.8)	Vertical front door	T130A (1340 ℓ) (354gal.)	
	XK152A	1400 x 1050 x 700 (55.1 x 41.3 x 27.6)	1350 x 1000 x 600 (53.1 x 39.4 x 23.6)	550 to 900 (21.7 to 35.4)	315 to 650 (12.4 to 25.6)	250 (9.8)	Hinged open/close method	T130A (1340 ℓ) (354gal.)	Dummy workpiece 100L
	XK160AS	1500 x 1000 x 600 (59.1 x 39.4 x 23.6)	1450 x 950 x 500 (57.1 x 37.4 x 19.7)	450 to 800 (17.7 to 31.5)	265 to 550 (10.4 to 21.7)	150 (5.9)	Vertical front door	T130A (1340 ℓ) (354gal.)	
EA40M	XK210A	2000 x 1200 x 700 (78.7 x 47.2 x 27.6)	1900 x 1100 x 600 (74.8 x 43.3 x 23.6)	450 to 900 (17.7 to 35.4)	310 to 650 (12.2 to 25.6)	—	Automatic vertical front door	2650 ℓ (700gal.)	
	XK212A	2000 x 1200 x 800 (78.7 x 47.2 x 31.5)	1900 x 1100 x 700 (74.8 x 43.3 x 27.6)	550 to 1000 (21.7 to 39.4)	360 to 750 (14.2 to 29.5)	100 (3.9)	Automatic vertical front door	3400 ℓ (900gal.)	
	XK240A	2300 x 1600 x 700 (90.5 x 63.0 x 27.6)	2200 x 1500 x 600 (86.6 x 59.1 x 23.6)	450 to 900 (17.7 to 35.4)	310 to 650 (12.2 to 25.6)	—	Automatic vertical front door	3400 ℓ (900gal.)	Dummy workpiece 400L
	XK261A	2500 x 1200 x 800 (98.4 x 47.2 x 31.5)	2400 x 1100 x 700 (94.5 x 43.3 x 27.6)	550 to 1000 (21.7 to 39.4)	360 to 750 (14.2 to 29.5)	100 (3.9)	Automatic vertical front door	3400 ℓ (900gal.)	Dummy workpiece 200L
EA50M	XK291A	2800 x 1600 x 1100 (110.2 x 63.0 x 43.3)	2700 x 1500 x 1000 (106.3 x 59.1 x 39.4)	700 to 1300 (27.6 to 51.2)	500 to 1050 (19.7 to 41.3)	200 (7.8)	Automatic vertical front door	6300 ℓ (1660gal.)	Dummy workpiece 300L

Automatic filter system

- Long-life laminated paper wafers with outstanding filtering performance are used
- Reverse washing eliminates filter replacement (option for EA40/ EA50)

Automatic filter

Type	Capacity	Remarks
TF40	3000 ℓ (790gal.)	EA40 (XK170)
TF50	4000 ℓ (1060gal.)	EA40 (XK212A)
TF63	6300 ℓ (1660gal.)	EA50 (XK270)



Options and retrofit specifications differ according to country and region, so please check with your dealer.

Machine specifications

		EA8PVM ADVANCE	EA12VM ADVANCE	EA28VM ADVANCE	MA2000M
Machine unit	Dimensions (W x D x H)	1460 x 1900 x 2020 (57.5 x 74.8 x 79.5) [mm (in)]	1750 x 2050 x 2335 (68.8 x 80.7 x 91.9) [mm (in)]	2195 x 2512 x 2615 (86.4 x 98.9 x 103.0) [mm (in)]	2432 x 2421 x 2480 (95.7 x 95.3 x 97.6) [mm (in)]
	System total weight	2000 (4400) [kg (lb.)]	3725 (8200) [kg (lb.)]	5400 (11880) [kg (lb.)]	6000 (13000) [kg (lb.)]
Axis stroke (X x Y x Z)		300 x 250 x 250 (11.8 x 9.8 x 9.8) [mm (in)]	400 x 300 x 300 (15.7 x 11.8 x 11.8) [mm (in)]	650 x 450 x 350 (25.6 x 17.7 x 13.8) [mm (in)]	400 x 300 x 300 (15.7 x 11.8 x 11.8) [mm (in)]
Spindle	Distance between table and electrode mounting surface	223 to 473 (70 (2.8) granite table (8.8 to 18.6) specifications) [mm (in)]	270 to 570 (10.6 to 22.4) [mm (in)]	425 to 775 (16.7 to 30.5) [mm (in)]	153 to 453(GR-MACRO) (6.0 to 17.8) [mm (in)]
	Max. electrode weight	25 (55) [kg (lb.)]	50 (110) [kg (lb.)]	200 (440) [kg (lb.)]	50 (110) [kg (lb.)]
Working tank	Method	Vertical front door (automatic elevation tank: option)	Automatic elevation tank	Automatic elevation tank	Automatic elevation tank
	Internal dimensions (W x D x H)	770 x 500 x 230 (30.3 x 19.7 x 9.1) [mm (in)]	850 x 600 x 350 (33.5 x 23.6 x 13.7) [mm (in)]	1100 x 810 x 450 (1400 x 900 x 550 : option) (43.3 x 31.9 x 17.7) (55.1 x 35.4 x 21.7) [mm (in)]	650 x 500 x 340 (25.5 x 19.6 x 13.3) [mm (in)]
	Fluid level adjustment range (from top of table)	90 to 180 (70 (2.8) granite table (3.5 x 7.1) specifications) [mm (in)]	100 to 300 (3.9 x 11.8) [mm (in)]	100 to 400 (3.9 x 15.7) [mm (in)]	100 to 300 (3.9 x 11.8) [mm (in)]
Table (granite)	Dimensions (W x D)	500 x 350 (19.7 x 13.8) [mm (in)]	700 x 500 (27.5 x 19.6) [mm (in)]	850 x 600 (1100 x 750 : option) (33.5 x 23.6) (43.3 x 29.5) [mm (in)]	550 x 470 (21.6 x 18.5) [mm (in)]
	Max. workpiece dimensions (W x D x H)	740 x 470 x 130 (70 (2.8) granite table (29.1 x 18.5 x 5.1) specifications) [mm (in)]	800 x 550 x 250 (31.4 x 21.6 x 9.8) [mm (in)]	1050 x 760 x 350 (41.3 x 29.9 x 13.8) [mm (in)]	600 x 450 x 250 (23.6 x 17.7 x 9.8) [mm (in)]
	Max. loading weight	550 (1210) [kg (lb.)]	700 (1540) [kg (lb.)]	2000 (4400) [kg (lb.)]	700 (1540) [kg (lb.)]
	T-slot	Two slots at 13-120 pitch	Three slots at 12-160 pitch	Three slots at 14-200 pitch	Four slots at 13-130 pitch
Dielectric fluid reservoir	Capacity	165 (44) [ℓ (gal.)]	340 (90) [ℓ (gal.)]	390 (100) [ℓ (gal.)]	390 (100) [ℓ (gal.)]
	Filtering method	One fine paper filter	Two fine paper filters	Three fine paper filters	One fine paper filter
	Dielectric fluid temperature control unit	Unit cooler	Unit cooler	Unit cooler	Unit cooler

		EA8M	EA12DM	EA30M	EA40M	EA50M
Machine unit	Dimensions (W x D x H)	1625 x 1717 x 2000 (63.9 x 67.5 x 78.7) [mm (in)]	1840 x 1960 x 2375 (72.4 x 77.1 x 93.5) [mm (in)]	2520 x 3055 x 2495 (99.2 x 120.2 x 98.2) [mm (in)]	3050 x 3633 x 3140 (120.0 x 143.0 x 123.6) [mm (in)]	4280 x 4295 x 4100 (168.5 x 169.0 x 161.4) [mm (in)]
	System total weight	2000 (4400) [kg (lb.)]	2900 (6300) [kg (lb.)]	6860 (15100) [kg (lb.)]	12000 (26000) [kg (lb.)]	20000 (44000) [kg (lb.)]
Axis stroke (X x Y x Z)		300 x 250 x 250 (11.8 x 9.8 x 9.8) [mm (in)]	400 x 300 x 300 (15.7x 11.8 x 11.8) [mm (in)]	700 x 500 x 350 (27.5 x 19.6 x 13.7) [mm (in)]	1000 x 600 x 450 (39.3 x 23.6 x 17.7) [mm (in)]	1500 x 600 x 600 (59.0 x 23.6 x 23.6) [mm (in)]
Spindle	Distance between table and electrode mounting surface	200 to 450 (7.8 to 17.7) [mm (in)]	300 to 600 (11.8 to 23.6) [mm (in)]	300 to 650 (11.8 to 25.5) [mm (in)]	450 to 900 (17.7 to 35.4) [mm (in)]	500 to 1100 (19.6 to 43.3) [mm (in)]
	Max. electrode weight	25 (55) [kg (lb.)]	50 (110) [kg (lb.)]	200 (440) [kg (lb.)]	300 (660) (500 (1100)(Note 1)) [kg (lb.)]	500 (1100) [kg (lb.)]
Working tank	Method	Vertical front door	Vertical front door	Vertical front door	Automatic vertical front door	Automatic vertical front door
	Internal dimensions (W x D x H)	770 x 500 x 250 (30.3 x 19.6 x 9.8) [mm (in)]	1050 x 700 x 450 (41.3 x 27.5 x 17.7) [mm (in)]	1280 x 850 x 450 (50.4 x 33.4 x 17.7) (XK140A) [mm (in)]	1600 x 1100 x 500 (62.9 x 43.3 x 19.6) (XK170) [mm (in)]	2500 x 1600 x 850 (98.4 x 62.9 x 33.4) (XK270) [mm (in)]
	Fluid level adjustment range (from top of table)	110 to 200 (4.3 to 7.8) [mm (in)]	180 to 400 (7.0 to 15.7) [mm (in)]	190 to 400 (4.3 to 15.7) [mm (in)]	200 to 450 (7.8 to 17.7) [mm (in)]	400 to 800 (15.7 to 31.4) [mm (in)]
Table (granite)	Dimensions (W x D)	500 x 350 (19.6 x 13.7) [mm (in)]	700 x 500 (27.5 x 19.6) [mm (in)]	1100 x 750 (43.3 x 29.5) [mm (in)]	1400 x 950 (55.1 x 37.4) [mm (in)]	2000 x 1350 (78.7 x 53.1) [mm (in)]
	Max. workpiece dimensions (W x D x H)	740 x 470 x 150 (29.1 x 18.5 x 5.9) [mm (in)]	1000 x 650 x 350 (39.3 x 25.5 x 13.7) [mm (in)]	1230 x 800 x 350 (48.4 x 31.5 x 13.8) [mm (in)]	1500 x 1000 x 400 (59.0 x 39.3 x 15.7) [mm (in)]	2400 x 1500 x 750 (94.4 x 59.0 x 29.5) [mm (in)]
	Max. loading weight	550 (1200) [kg (lb.)]	1000 (2200) [kg (lb.)]	2000 (4400) [kg (lb.)]	5000 (11000) [kg (lb.)]	10000 (22000) [kg (lb.)]
	T-slot	Three slots at 12-100 pitch	Three slots at 12-160 pitch	Four slots at 14-180 pitch	Five slots at 14-200 pitch	Seven slots at 14-200 pitch
Dielectric fluid reservoir	Capacity	196 (50) [ℓ (gal.)]	500 (130) [ℓ (gal.)]	800 (210) [ℓ (gal.)]	1900 (500) [ℓ (gal.)]	5200 (1370) [ℓ (gal.)]
	Filtering method	One paper filter	One paper filter	One paper filter	Two paper filters	Four paper filters
	Dielectric fluid temperature control unit	Fan cooler	Unit cooler	Unit cooler	Unit cooler	Unit cooler

(Note 1) The maximum electrode weight 500kg (227.0lb.) specifications are available as an option for the EA40.

Options

Main option correspondence table ◎Standard equipment ○Can be added after installation ●Cannot be added after installation ×Not available

				EA8PVM ADVANCE	EA12VM ADVANCE	EA28VM ADVANCE	MA2000M
Machine body	Lubricant	Automatic lubrication unit		◎	◎	◎	◎
	Scale	Scale feedback specifications	Z-axis	◎	◎	◎	◎
			XY-axis	◎	◎	●	◎
	Thermal displacement compensation system			◎	◎	◎	◎
	Granite table			◎	×	×	◎
	Column up specifications			×	100mm (3.9")	150mm (5.9")	×
	High-function manual operation box			○	○	◎	◎
	Lighting			○	○	○	○
Working tank	Automatic elevation tank			●	◎	◎	◎
	Special working tank			×	×	● (Note 1)	×
Dielectric fluid system	Dielectric filter	Paper filter - 2-pc. specifications		×	◎	×	×
		Paper filter - 3-pc. specifications		×	×	◎	×
		Paper filter - 4-pc. specifications		×	×	×	×
		Automatic filter		×	×	×	×
	Cooler	Dielectric fluid temperature controller (unit cooler)		◎	◎	◎	◎
		Dielectric fluid temperature controller (for booster power)		×	×	×	×
	Fluid system	Dielectric fluid automatic supply/drain		◎	◎	◎	◎
		Emission/suction automatic changeover		●	●	●	×
		Programmable flushing nozzle selection, automatic changeover		● (Note 2)	●	●	● (Note 3)
		Dielectric fluid distributor		○	○	○	○
Power supply	Main power supply	FP80V		◎	◎	◎	×
		FP120V		×	●	●	×
		FP60EA / MA		×	×	×	◎
		FP100EA		×	×	×	×
		FP100B (Note 4)		×	×	×	×
	Special power supply	SP power supply (for tungsten carbide machining)		×	×	×	○ (Note 5)
		NP2 circuit		◎	×	×	◎
		Narrow gap circuit		◎	◎	◎	×
		GF2 control		●	●	●	×

				EA8M	EA12DM	EA30M	EA40M	EA50M
Machine body	Lubricant	Automatic lubrication unit		◎	◎	◎	◎	◎
	Scale	Scale feedback specifications	Z-axis	×	◎	◎	×	×
			XY-axis	×	●	×	×	×
	Thermal displacement compensation system			×	×	◎	◎	◎
	Granite table			×	×	×	×	×
	Column up specifications			×	×	100, 150, 250mm (3.9", 5.9", 9.8")	100mm (3.9")	200mm (7.9")
	High-function manual operation box			○	○	◎	◎	◎
	Lighting			○	○	○	○	○
Working tank	Automatic elevation tank			×	×	×	×	×
	Special working tank			×	×	●	●	●
Dielectric fluid system	Dielectric filter	Paper filter - 2-pc. specifications		×	×	○	◎	×
		Paper filter - 3-pc. specifications		×	×	×	×	×
		Paper filter - 4-pc. specifications		×	×	×	×	◎
		Automatic filter		×	×	●	●	●
	Cooler	Dielectric fluid temperature controller (unit cooler)		◎	◎	◎	◎	◎
		Dielectric fluid temperature controller (for booster power)		×	×	●	●	●
	Fluid system	Dielectric fluid automatic supply/drain		○	◎	◎	◎	◎
		Emission/suction automatic changeover		×	×	×	×	×
		Programmable flushing nozzle selection, automatic changeover		○ (Note 1)	×	○	○	○
		Dielectric fluid distributor		○	○	○	○	○
Power supply	Main power supply	FP80V		×	×	×	●	×
		FP120V		×	×	×	●	×
		FP60EA / MA		◎	◎	◎	×	×
		FP100EA		×	●	●	◎	◎
		FP100B (Note4)		×	×	●	●	●
	Special power supply	SP power supply (for tungsten carbide machining)		○	○	×	×	×
		NP2 circuit		×	×	×	×	×
		Narrow gap circuit		×	×	×	×	×
		GF2 control		×	×	×	×	×

(Note 1) When the special working tank is at the lowest limit, the upper end of the working tank is approx. 95mm (3.7") above the table.
(Note 2) The shuttle ATC cannot be used with the programmable flushing nozzle.
(Note 3) Six programmable flushing nozzles can be selected for MA2000.
(Note 4) FP100EA power supply.
(Note 5) The maximum working tank elevation position will change if the SP power supply is equipped.
(The maximum workpiece height will be 200mm.)

High-function manual operation box

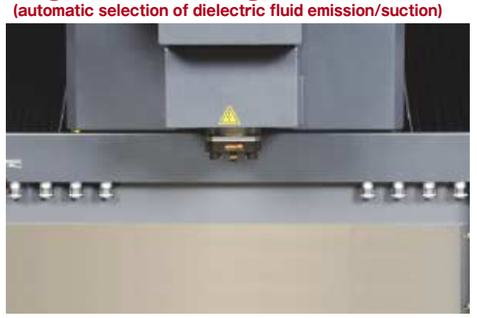
LCD display improves workability.
Workpiece coordinates can be set from manual operation box.
Jog feedrate can be changed between 50 and 150% with override function.

Lighting (fluorescent lamp)

Automatic filter

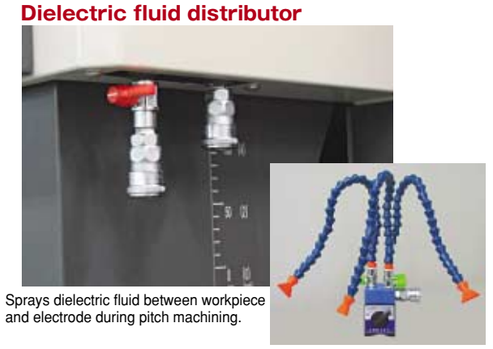
Effective for medium-to large-sized EDMs which discharge large quantities of sludge.
Reverse wash function is effective in achieving high performance over a long time.

Programmable flushing nozzle selection (automatic selection of dielectric fluid emission/suction)



Fluid treatment for multiple set-up machining etc (set either emission or suction for coupler and sequentially execute with NC program).
(photo shows EA12V specifications)

Dielectric fluid distributor



Sprays dielectric fluid between workpiece and electrode during pitch machining.

Distributes dielectric fluid into three flows and sprays onto machining section.

Options and retrofit specifications differ according to country and region, so please check with your dealer.

Options

Main option correspondence table ◎Standard equipment ○Can be added after installation ●Cannot be added after installation ×Not available

				EA8PVM ADVANCE	EA12VM ADVANCE	EA28VM ADVANCE	MA2000M	EA8M	EA12DM	EA30M	EA40M	EA50M
Head-side tooling	Built-in C-axis (Note 1) (Note 2)			○	○	○	◎	○	○	○	●	●
	High-accuracy built-in spindle (Note 1)			●	●	●	●	×	×	×	×	×
	Automatic clamp			○	○	○	×	○	○	○	○	○
	Removable holder (3R-16M-MACRO-R specifications)			○	○	○	×	○	○	○	○	○
	Large electrode adaptor			×	● (Note 3)	○	×	×	×	○	○	○
ATC(Note 4)	Shuttle	4T	3R-MACRO	○ (Note 9)	×	×	×	○ (Note 5)	○	×	×	×
			EROWA-ITS	○ (Note 9)	×	×	×	○ (Note 5)	○	×	×	×
		7T	3R-Combi	○ (Note 9)	×	×	×	○ (Note 5)	○	×	×	×
	LS	20T	3R-MACRO	×	×	×	◎	×	×	×	×	×
			EROWA-ITS	×	×	×	◎	×	×	×	×	×
	MVH	20T	3R-MACRO	●	○	○	×	×	○	○	●	●
			EROWA-ITS	●	○	○	×	×	○	○	●	●
			3R-Combi	●	○	○	×	×	○	○	×	×
		40T	3R-MACRO	×	○	○	●	×	×	○	×	×
			EROWA-ITS	×	○	○	●	×	×	○	×	×
			3R-Combi	×	○	○	×	×	×	○	×	×
Control unit	Communication	External signal output (M code)		○	○	○	○	○	×	○	○	○
		DNC H/W		◎	◎	◎	◎	○	○	○	○	○
		FTP		○	○	○	◎	○	○	○	○	○
		DNC S/W		○	○	○	◎	○	○	○	○	○
		RS232C interface		×	×	×	◎	◎	◎	◎	◎	◎
NS powder specifications				×	●	●	×	×	×	●	×	×
Fine-hole jig specifications (Note 6)				●	●	×	×	×	×	×	×	×
Safety	Infrared flame detector			●	●	●	● (Note 7)	●	×	●	●	×
	Double automatic fire extinguisher specifications			●	●	●	● (Note 8)	×	×	●	●	●
Display	Run timer			○	○	○	○	○	×	○	○	○
	3-color warning light			○	○	○	○	○	×	○	○	○
Paint color designation				●	●	●	×	×	×	●	●	●

(Note 1) Select the chuck from the following types: 3R-MACRO, 3R-Combi, EROWA-ITS, EROWA-COMBI
(Note 2) The highly rigid C-axis unit is compatible with all Advance models and MA2000.
(Note 3) Mountable only when using spindle.
(Note 4) Contact your Mitsubishi Electric sales office or dealer for details on the large ATC.
(Note 5) The shuttle ATC cannot be used with the programmable flushing nozzle.
(Note 6) A built-in spindle is required. Fine-hole guide (ϕ0.15 to 2.0mm) is required.
(Note 7) MVH-ATC and automation cannot be combined.
(Note 8) The working tank elevation position is limited.
(Note 9) The working tank automatic elevation specifications and shuttle-type ATC cannot be combined for the EA8PV.

Run timer

3-color warning light

Indicates machine operation status

Network Connection Specifications (DNC, FTP option)

Data such as NC programs, machining conditions and variables can be exchanged between a personal computer and EDM.
The required options differ according to the models and purpose, and can be confirmed with the following table.
One IP address must be prepared for each EDM within the user's in-house network.
When connecting the EDM to a network, provide a means to prevent the user's network environment or connected personal computer from being infected by a computer virus.

Required specifications	Image	Required option	Supplement
Operate on the EDM side, and receive data from personal computer	Data transmission	Standard	Data is received into the EDM's common HDD using the EDM's Explorer. After that, data I/O operations are required on the EDM.
Operate on the EDM side, and send data directly to the EDM's NC	Data transmission	FTP	Data can be received using data I/O operations.
Operate on the personal computer side, and send data to the EDM	Data transmission	Standard	The personal computer's Explorer and the EDM's common HDD are used. After that, data I/O operations are required on the EDM.
Operate on the personal computer side, and send data directly to the EDM's NC	Data transmission	DNC	Commercially-available DNC software must be installed on the personal computer side. Refer to the DNC specifications for details on operation.

Highly rigid C-axis (all Advance models, MA2000)

* Highly accurate helical machining and index machining are possible
* Compatible with fluid emission from spindle center
(photo shows 3R-MACRO chuck specifications)

High-accuracy built-in spindle

Compatible with high-speed rotation (1 to 1500min-1) machining
(photo shows 3R-MACRO chuck specifications)

Automatic clamp

* Clamp spindle side holder with air chuck
(photo shows EROWA-ITS chuck specifications)

Removable holder

Photo shows 3R-16M-MACRO-R specifications

Shuttle 4T (automatic tool changer)

Change up to four electrodes
Compatible with continuous machining using multiple electrodes

Shuttle 7T (automatic tool changer)

Change up to seven electrodes (only Combi specifications)
Compatible with continuous machining using multiple electrodes

Large electrode adapter

Prepare two T-slots and electrode mounting table installation screw
(photo shows EA28V Advance specifications)

MVH-20T (automatic tool changer)

Change up to 20 electrodes
Compatible with long-time continuous machining using multiple electrodes

MVH-40T (automatic tool changer)

Change up to 40 electrodes
Compatible with long-time continuous machining using multiple electrodes

NS powder

Dedicated mixer

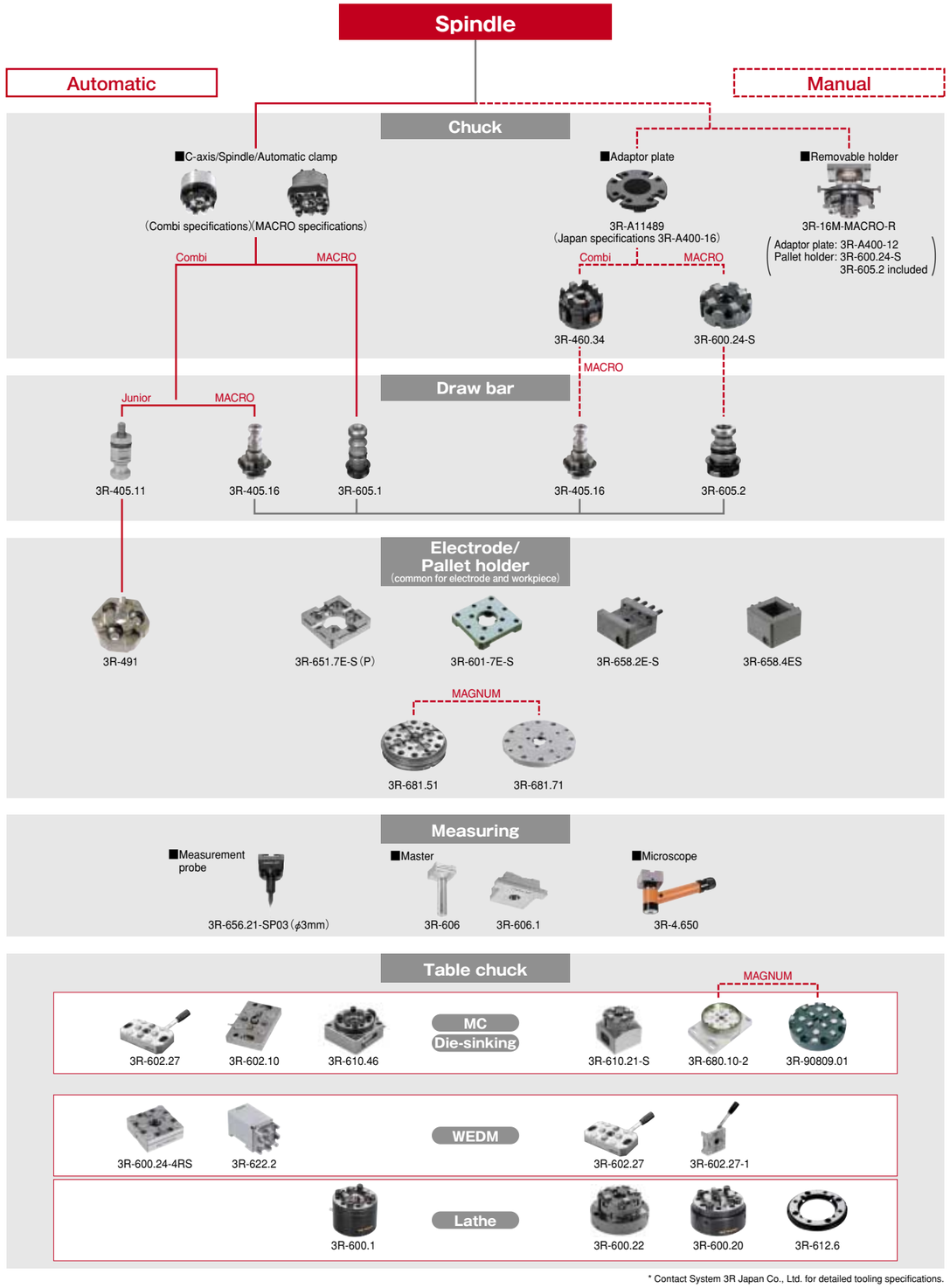
Fine-hole jig specifications

Removable, and compatible for ϕ0.15 to 2.0mm fine-hole machining
(photo shows EA12V Advance specifications)

Infrared flame detector

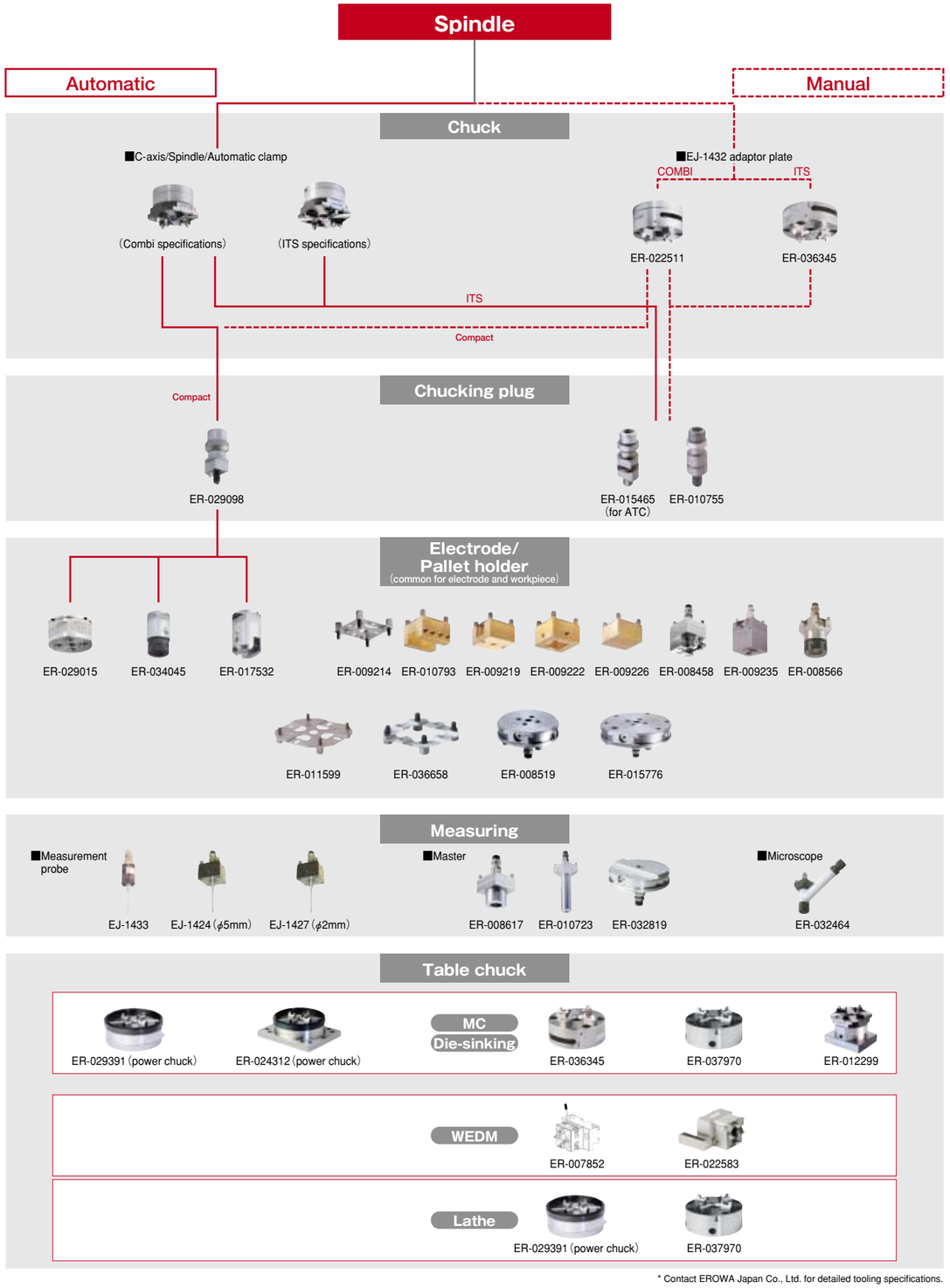
Catches infrared rays from flames and stops power supply

System 3R System Chart



* Contact System 3R Japan Co., Ltd. for detailed tooling specifications.

EROWA System Chart



* Contact EROWA Japan Co., Ltd. for detailed tooling specifications.

Power Supply and Control Specifications

	Applicable model	EA8PVM ADVANCE	EA12VM ADVANCE		EA28VM ADVANCE	
Power supply unit	Power supply model	FP80V-A	FP80V-A	FP120V-A	FP80V-A	FP120V-A
	Maximum machining current peak [A]	80	80	120	80	120
	Standard machining circuits and functions	Transistor pulse circuit (TP circuit), Super-low-wear circuit (SC, α-SC circuit), Fine matte finish circuit (PS circuit), Glossy mirror finish circuit (GM2 circuit), Ultrafine matte finish circuit (NP2 circuit), Fuzzy adaptive control, SS jump, OrbitPro	Transistor pulse circuit (TP circuit), Super-low-wear circuit (SC, α-SC circuit), Fine matte finish circuit (PS circuit), Glossy mirror finish circuit (GM2 circuit), Fuzzy adaptive control, SS jump, OrbitPro			
	Electrical-discharge adaptive control function	DynaTech				
	Power supply method	Resistor-less, low heat generating, compact, power regenerating, energy-saving				
	Cooling method	Indirect cooling				
Control unit	Control unit	C31EA-2				
	Input method	Keyboard, USB flash memory, Ethernet				
	Pointing device	Touch panel, mouse				
	Display	15-inch color TFT-LCD touch screen				
	Display characters	Alphanumeric characters				
	Control system	CNC closed loop				
	Number of controlled axis	Maximum four axis				
	Setting (command) unit	XYZ ... 0.1μm, C (rotary axis) ... 0.0001°				
	Minimum drive unit	XYZ ... 0.1μm, C (rotary axis) ... 0.0001°				
	Maximum command value	±99999.9999mm/±9999.99999inch				
	Position command format	Incremental/Absolute value combination				
	Interpolation function	Linear, circular, spiral				
	Orbit mode	Fixed pattern and random path, 3D pattern				
	Orbit control system	4 types (free, semi-fixed, fixed, variable)				
	Scale magnification	0.000001～99.999999/0.001～99999.999				
	Graphics	X-Y plane, XY-XZ plane, solid, table scale, background drawing, automatic machining path drawing, orbit block drawing				
	Automatic programming	New machining programming (E.S.P.E.R ADVANCE)				
	Program No. designation range	1～99999999				
	Sequence No. designation range	1～99999				
	Subprogram	Nesting levels: 30				
	Manual feed	High-speed, low-speed, inching (1μm/10μm), extension mode (high-speed/low-speed) Maximum feedrate XYZ: 2000 mm/min (When using override function (Note 1): 3000 mm/min)				
	Manual input positioning	Screen input				
	Graphic check	3D display compatible, high-speed graphic drawing				
	CRT screen basic menu	15 types (file, setup, machining support, monitor, maintenance, e-manual, know-how display, E-condition, NC program, variable, coordinate value, alarm troubleshooting, 3D viewer, calculator, USB removal)				
	Network specifications	Ethernet port (10/100BaseT (X) port RJ45 connector) 1 port				
	Maintenance functions	Consumption rate control (time display)				
Outline dimensions (W x D x H) [mm (in)]		400 (15.7) x 900 (35.4) x 1763 (69.4) (FP80V) (Pendant 500 (19.7) x 175 (6.9) x 346 (13.6))				
Weight [kg (lb.)]		260 (570)	260 (570)	300 (660)	260 (570)	300 (660)

(Note 1) Valid only for high-function manual operation box (option). Cannot be used with standard simple manual operation box.
The high-function manual operation box is standard for the EA28VM ADVANCE, MA2000M, EA30M, EA40M and EA50M.

Control unit functions

C31 (Advance control unit) control unit functions

NC functions	Corner chamfer command	Maintenance functions
Year, month, date display	Linear angle command	Maintenance check
Character string replace function	Backlash compensation	Alarm display (with troubleshooting guidance)
Teaching function	Pitch error compensation	
Machining start time designation function	Soft limit (inside/outside prohibit)	e-manual (electronic manual)
	Reference block	System update over web
Various timers	Automatic zero point return	**Automatic positioning functions**
Automatic return	Electrode multiple deviation compensation (Electrode rotation compensation)	Edge positioning
Start point return		Hole center positioning
Axis rotation	**Machining functions**	Pole center positioning
Program support function	Fuzzy Pro Plus adaptive control	Electrical-discharge positioning
E.S.P.E.R ADVANCE	Machining results graph, machining results table	Width center positioning
E.S.P.E.R ADVANCE Navigator		Slot center positioning
Memory operation	Machining condition expert	3-point center positioning
Offset	Master Pack	2 to 4 face positioning
Coordinate value read	Orbit machining	Repeated positioning
Time read	Taper machining	**Check functions**
Workpiece coordinate system (106 coordinates)	Lateral machining	Graphics (machining shape drawing)
	Automatic coreless machining	Single block
Coordinate rotation	3D machining	Dry run
Figure rotation	Side servo machining	Block delete
Axis change	Offset machining	3D graphic check
Mirror image	Inclined machining	3D viewer (Parasolid data display)
Scales for XY-axis	Contour machining (spindle required)	EPX format data read
Function computations	C-axis machining (C-axis required)	
Corner R command		

C30 control unit functions

NC functions	Corner chamfer command	Maintenance functions
Year, month, date display	Linear angle command	Maintenance check
Character string replace function	Backlash compensation	Alarm display
Teaching function	Pitch error compensation	**Automatic positioning functions**
Machining start-time designation function	Soft limit (inside/outside prohibit)	Edge positioning
	Reference block	Hole center positioning
Various timers	Automatic zero point return	Pole center positioning
Automatic return	Electrode multiple deviation compensation (Electrode rotation compensation)	Electrical-discharge positioning
Start point return		Width center positioning
Axis rotation	**Machining functions**	Slot center positioning
Program support function	Fuzzy Pro Plus adaptive control	3-point center positioning
New machining programming (E.S.P.E.R	Machining results graph, machining results table	2 to 4 face positioning
Program support (E.S.P.E.R Navigator)		Repeated positioning
Memory operation	Machining condition expert	**Check functions**
Offset	Master Pack	Graphics (machining shape drawing)
Coordinate value read	Orbit machining	Single block
Time read	Taper machining	Dry run
Workpiece coordinate system (106 coordinates)	Lateral machining	Block delete
	Automatic coreless machining	
Coordinate rotation	3D machining	
Figure rotation	Side servo machining	
Axis change	Offset machining	
Mirror image	Inclined machining	
Scales for XY-axis	Contour machining (spindle required)	
Function computations	C-axis machining (C-axis required)	
Corner R command		

	Applicable model	MA2000M	EA8M	EA12DM / EA30M		EA40M / EA50M
Power supply unit	Power supply model	FP60MA	FP60EA	FP60EA	FP100EA	FP100EA
	Maximum machining current peak [A]	80	80	80	120	120
	Standard machining circuits and functions	Transistor pulse circuit (TP circuit), Super-low-wear circuit (SC, α-SC circuit), Fine matte finish circuit (PS circuit), Glossy mirror finish circuit (GM2 circuit), Ultrafine matte finish circuit (NP2 circuit), Fuzzy adaptive control, SS jump, OrbitPro	Transistor pulse circuit (TP circuit), Super-low-wear circuit (SC, α-SC circuit), Fine matte finish circuit (PS circuit), Glossy mirror finish circuit (GM2 circuit), Fuzzy adaptive control, SS jump, OrbitPro			
	Electrical-discharge adaptive control function	DynaTech				
	Power supply method	Resistor-less, low heat generating, compact power supply				
	Cooling method	Indirect cooling				
Control unit	Control unit	C30EA-2				
	Input method	USB flash memory, RS232C				
	Pointing device	Slide pad				
	Display	10.4-inch color LCD				
	Display characters	Alphanumeric characters				
	Control system	CNC closed loop (Z-axis scale feedback specifications standard, excluding EA8M)				
	Number of controlled axis	Maximum four axis				
	Setting (command) unit	XYZ ... 0.1μm, C (rotary axis) ... 0.0001°				
	Minimum drive unit	XYZ ... 0.1μm, C (rotary axis) ... 0.0001°				
	Maximum command value	±99999.9999mm/±9999.99999inch				
	Position command format	Incremental/Absolute value combination				
	Interpolation function	Linear, circular, spiral				
	Orbit mode	Fixed pattern and random path, 3D pattern				
	Orbit control system	4 types (free, semi-fixed, fixed, variable)				
	Scale magnification	0.000001～99.999999/0.001～99999.999				
	Graphics	X-Y plane, XY-XZ plane, solid, table scale, background drawing, automatic machining path drawing, orbit block drawing				
	Automatic programming	Machining programming (E.S.P.E.R)				
	Program No. designation range	1～99999999				
	Sequence No. designation range	1～99999				
	Subprogram	Nesting levels: 30				
	Manual feed	High-speed, low-speed, inching (1μm/10μm), extension mode (high-speed/low-speed) Maximum feedrate XYZ: 2000 mm/min (When using override function (Note 1): 3000 mm/min)				
	Manual input positioning	Screen input				
	Graphic check	High-speed graphic drawing				
	CRT screen basic menu	8 types				
	RS232C interface	Code control (including DC1, DC3) / Line control method				
	LAN specifications	Standard (DNC, FTP, remote monitor)	Option (DNC, FTP, remote monitor) (Note 2)			
	Maintenance functions	Consumption rate control (time display)				
Outline dimensions (W x D x H) [mm (in)]		(Included in machine dimensions)	500 (19.7) x 550 (21.7) x 1610 (63.4) (Pendant 546 (21.5) x 170 (6.7) x 346 (13.6))		500 (19.7) x 840 (33.1) x 1610 (63.4) (Pendant 546 (21.5) x 170 (6.7) x 346 (13.6))	
Weight [kg (lb.)]		260 (570)	180 (400)		300 (660)	

(Note 1) Valid only for high-function manual operation box (option). Cannot be used with standard simple manual operation box.
(Note 2) Refer to page 35 for the LAN specification option combinations. The DNC or FTP option is required to validate the remote monitor function.

Machine, power supply and dielectric fluid temperature control unit combinations

		Power supply						Dielectric fluid temperature control unit [kW]	Total input capacity [kVA]	Machine's generated heating value [kW] (Note 4)
		FP80V-A	FP120V-A	FP60EA/MA	FP100EA	FP100B	SP			
Machine (Note 3)	EA8M	—	—	○	—	—	○	1.74 (standard equipment)	6.8	4.1
		—	—	○	—	—	—	1.74 (standard equipment)	11.8	7.1
	EA12DM	—	—	○	—	—	—	1.74 (standard equipment)	8.2	4.9
		—	—	○	—	—	○	1.74 (standard equipment)	13.2	7.9
		—	—	—	○	—	—	3.50 (standard equipment)	15.6	9.4
	EA8PVM ADVANCE	○	—	—	—	—	—	1.74 (standard equipment)	6.5	3.9
	EA12VM ADVANCE	○	—	—	—	—	—	1.74 (standard equipment)	7.0	4.2
		—	○	—	—	—	—	3.50 (standard equipment)	10.0	6.0
	EA28VM ADVANCE	○	—	—	—	—	—	1.74 (standard equipment)	9.0	5.4
		—	○	—	—	—	—	3.50 (standard equipment)	13.0	7.8
	EA28VM ADVANCE Special working tank	○	—	—	—	—	—	3.50 (standard equipment)	10.0	6.0
		—	○	—	—	—	—	3.50 (standard equipment)	14.0	8.4
	EA30M	—	—	○	—	—	—	3.50 (standard equipment)	15.5	9.3
		—	—	—	○	—	—	3.50 (standard equipment)	19.0	11.4
		—	—	—	○	○	—	8.70 (option)	26.0	15.6
	MA2000M	—	—	○	—	—	—	3.50 (standard equipment)	15.0	9.0
		—	—	○	—	—	○	3.50 (standard equipment)	20.0	12.0
Maximum machining current average [A]		60	100	60	100	200	・SP: power supply for tungsten carbide machining ・FP100B: booster power supply			
Maximum machining current peak [A]		80	120	80	120	270				

(Note 3) Contact your local Mitsubishi Electric sales office or dealer regarding EA40M, EA50M and VH10M.
(Note 4) The machine's generated heating value is a reference value. Refer to page 48 for details on calculating the value.

Mitsubishi Electric EDM Automation System

Electrode/Workpiece automatic changer unit EDCHANGE

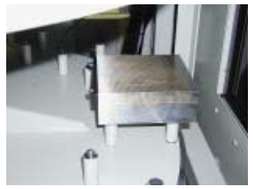
- Change electrode and workpiece pallet with a single unit
- Multiple units can be automated with one electrode/workpiece change unit to match system configuration
- Stacked pallet structure enables a compact and large-capacity magazine configurations

Installation dimensions (W×D×H) 3400×2050×2812[mm] (excluding maintenance space)
Configuration: EA12V Advance + EDCHANGE

Electrode changing

Workpiece changing

Electrode installation



Workpiece installation

Photo shows 5-level stocker specifications
(10 workpieces, 144 electrode specifications)

EDCHANGE standard specifications

Item	Specifications
Maximum workpiece dimensions (Note 1) Including pallet	200×150×100 (7.9×5.9×3.9) [mm (in)]
Pallet stock quantity	8 [pallets]
Maximum electrode dimensions	70×70×180 (2.8×2.8×7.1) [mm (in)]
Electrode stock quantity	48 [electrodes]
Number of stocker levels	3 [levels]
Unit dimensions (W×D×H) (Note 2)	1193×1113×2812 (47.0×43.8×110.7) [mm (in)]

(Note 1) The stocked quantity will differ according to the maximum workpiece dimensions, maximum electrode dimensions and jig type, etc. Consult with Mitsubishi Electric in regard to the required machining details.
(Note 2) Dimensions for EDCHANGE unit.
(Note 3) The input power supply is 3-phase 200V 2kVA, and the air source is 0.5MPa or more, 0.1Nm³/min.

Automated system line-up

EA12V Advance multi-axis articulated robot system

Installation dimensions (W×D×H) 3210×2240×2900[mm] (excluding maintenance space)
Configuration: EA12V Advance + EDCHANGE-RE12

EA12V Advance dual-unit control system

Installation dimensions (W×D×H) 5788×2050×2812[mm] (excluding maintenance space)
Configuration: EA12V Advance × 2 units + EDCHANGE

Examples of automated system effect

Evaluation item	Effect	
	Example of stand-alone machine	Example of automated system
Machine operation rate	100 to 300 hr/mo	500 to 600 hr/mo
Manned ratio	60%, 1.6 units controlled by one operator	20%, 5 units controlled by one operator
Set-up performance (time for measuring 100 electrodes)	Positioning using die-sinking EDM: Approx. 300 min	Positioning with coordinate measuring machine: Approx. 50 min
Work mistake occurrence rate	Approx. 10% (program input mistakes, etc.)	Less than 1%

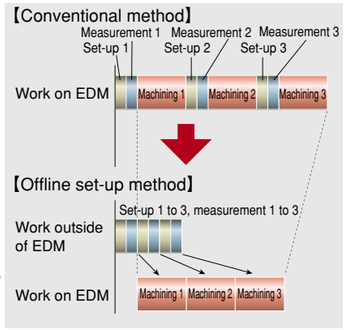
This is an example of using the system. The effect may differ according to the system configuration.

Electrode/Workpiece control

Offline set-up system

- A system to carry out electrode core alignment measurement and pallet set-up measurement outside of the EDM can be structured by using this system with the coordinate measuring machine

Coordinate measuring machine



Concept diagram for improving set-up performance (external set-up system)

* Contact your local Mitsubishi Electric sales office or dealer for details on which coordinate measuring machines can be used.

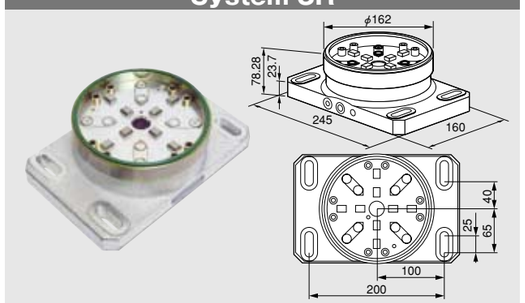
ID tag system

- The ID tag attached to the electrode or workpiece pallet can be read and registered into the program by scanning a reader near it
- Each electrode and workpiece can be clearly identified to eliminate mounting mistakes

Pallet tooling

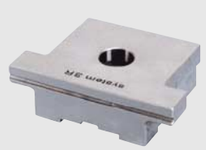
- Pallets can be supplied using combinations with the System 3R/EROWA table chuck
- The user's original system can be configured with a magnet chuck and pallet jigs to match the required machining details

System 3R



3R-680.10-2 Magnum chuck

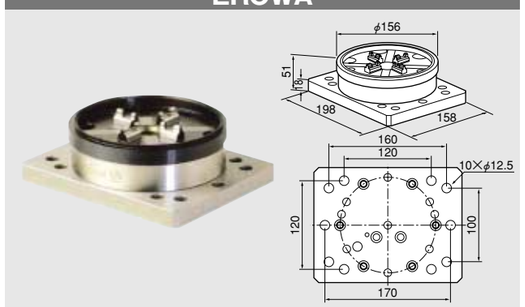
Chuck accuracy adjustment tool



3R-606.1
Macro master

3R-686.1-HD
Magnum master pallet

EROWA



ER-024312 Power chuck

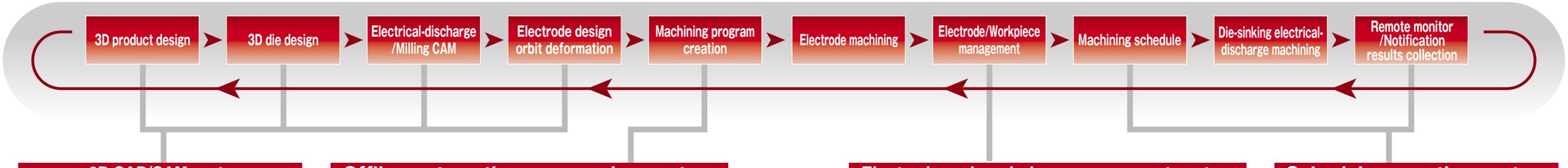
Chuck accuracy adjustment tool

ER-008617
Inspection block

ER-032819
φ115mm alignment pallet

* Refer to the tooling section on pages 39 and 40 for example combinations. Contact tooling makers individually for details.
* Contact your local Mitsubishi Electric sales office or dealer for details on which components are required to configure the system.

Offline Applications

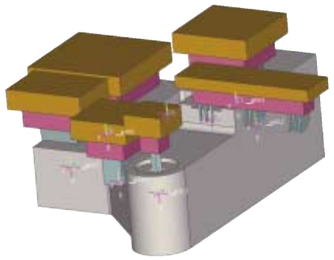


3D CAD/CAM system

CamMagic AD

Electrode design CAD

- A 3D model of the product is designed to extract the sections requiring electrical-discharge machining because of inaccessibility with milling tools
- 3D electrode models can be created easily, and orbit deformation can be handled



Die-sinking electrical-discharge CAM

- The machining coordinates are automatically calculated for CAD-use, eliminating the need for input and reducing mistakes during value inputs
- The inner set-up core alignment measurement position can be measured
- 3D models can be input with Advance EDM
- Operations can be sequenced to wire, milling and hole machining CAMs

Offline automatic programming system

ESPERADVANCE PRO

Create programs for die-sinking EDM with personal computer

- Same screens and operability as Advance EDM
  Compatible with 64-bit models (EA Series machining condition search is also available)
- Import data from CamMagic or EPX compatible CAD/CAM

Machining condition search

- Various machining conditions which match the application can be used with the shape expert function, thereby supporting even complicated programs

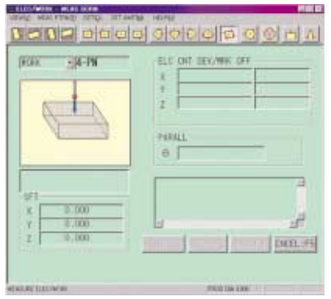
3D check function

- Check machining positions with 3D display
  3D data of electrodes and workpieces from a CAD/CAM can be used, and simple displays are also possible even without 3D data

Electrode and workpiece management system

Collaboration with coordinate measuring machine

- Import results of electrode measurements made with a coordinates measuring machine
- Register offset data into a program with ESPERADVANCE PRO



ID tag system

- Assign ID tags attached to electrodes or workpiece pallets and place near an ID reader to register numbers in a program
- Electrodes and workpieces are clearly identified by ID tags to prevent mounting mistakes

Job registration

- Register a program as a job and run it sequentially with the E.S.P.E.R SCHEDULER for schedule operation

Schedule operation system

E.S.P.E.R SCHEDULE

Manage die-sinking EDM's continuous operation

- Execute continuous schedule operation of EDMs with job management (manage up to five EDMs)
- Control ID numbers, as well as monitor the mounting state of electrodes and the state of communications with the EDM and electrode/workpiece changing robot

RemoteMagic II

EDM remote monitoring

- Remotely monitor machining with a personal computer
- Mail notifications when an alarm occurs

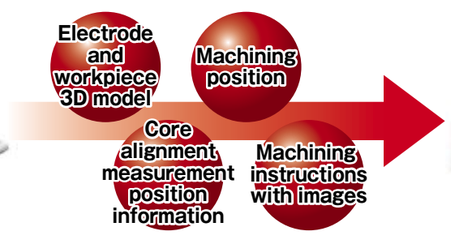
Utilization of 3D data at machining site

CamMagic AD

Data batch output function

- Output a batch of 3D data and machining instructions from the CAD/CAM to the die-sinking EDM

CAD/CAM


Electrode and workpiece 3D model
Machining position
Core alignment measurement position information
Machining instructions with images

ESPERADVANCE

3D-Advance

- Designer's intentions can be confirmed correctly and quickly to prevent input mistakes

Die-sinking EDM (Advance model)

Preparation for Machine Installation

Checklist for machine installation

1. Determining the machining details

1) Determine the workpiece	
2) Determine the machining site	
3) Determine the pre-processing site	
4) Determine the post-processing site	

• Check each item, and make sure that no item or order is overlooked

2. Preparation of installation fixtures

1) Plan the installation fixtures	
2) Prepare or manufacture the fixtures	

3. Preparation of tooling and electrode

1) Determination of tooling and electrode	
2) Order, preparation or manufacture	

• It normally takes one to two months for tooling delivery, so please place orders as early as possible

4. Training of programmers and operators

1) Select the programmers and operators	
2) Apply for training seminars	

5. Confirmation of foundation work and power supply work

1) Confirmation of floor area	
2) Confirmation of environment (constant pressure, dust-proof room, measure for radio disturbance, prevention of external noise)	
3) Confirmation of foundation floor	
4) Foundation work	
5) Confirmation of power supply (including grounding work), air source and other work completion	

• If there is any possibility of radio disturbance, refer to the "EDM Radio Disturbance and Countermeasures", and investigate the state beforehand. Class C grounding is recommended
• Prepare the following air source: 0.5 to 0.7MPa, flow rate of 27ℓ/min or more (36ℓ/min or more when using a built-in spindle, 0.6MPa or more when using EROWA tooling specifications)
• Prepare an air hose with inner diameter of ϕ9 to 10mm (The coupler socket 20SH is enclosed with the machine)
• The standard EA8, EA12V and EA28V specifications do not require an air source, but the above-mentioned air supply must be prepared when using the optional built-in C-axis, etc

6. Confirmation of delivery route

1) Traffic restrictions to factory		
Road width		
Entry road		
2) Factory entrance and width of gate in factory	m	
Factory building entrance dimensions (height x width)	m × m	

• Confirm the routes inside and outside the factory before delivery

7. File applications to fire department

1) Confirm the dielectric fluid amount 2) File applications to fire department (EDMs already installed must also be filed.)	
・Application for "Facility using fire" (fluid amount less than 400ℓ)	
・Application for "Low volume hazardous material storage and handling site" (fluid amount more than 400ℓ and less than 2,000ℓ)	
・Application for "General handling site" (fluid amount 2,000ℓ or more)	

• The applications must be filed before the EDM is installed. The required applications differ according to the region, so contact your nearest fire department for details

Oil for EDMs

Always use dielectric fluid which has a flash point of 70°C or more. Prepare the following dielectric fluid when operating the EDM.

■Dielectric fluid example (ENEOS Metal Work EDF-K2)

Table of dielectric fluid properties

Item \ Product brand	ENEOS Metal Work EDF-K2
Density g/cm³ (@15°C)	0.77
Ignition point °C (PM)	93
Kinematic viscosity mm²/s (@40˚C)	2.2
Appearance	Clear and colorless

※Contact the manufacturer for the Material Safety Data Sheet.

■Dielectric fluid example (Showa Shell Sekiyu Shell Paraol 250)

Table of dielectric fluid properties

Item \ Product brand	Shell Paraol 250
Density g/cm³ (@15°C)	0.797
Ignition point °C (PM)	92
Kinematic viscosity mm²/s (@40˚C)	2.42
Appearance	Clear and colorless

※Contact the manufacturer for the Material Safety Data Sheet.

Dielectric fluid is regulated by related ordinances as a "Hazardous Class 4 No. 3 petroleum". The designated quantity set forth by ordinances is 2,000ℓ (depending on the country and region).

When handling hazardous materials, such as an EDM and cutting oil, which have a flash point between 70 and 200°C in the same building, applications must be filed to the fire department according to the total amount handled.

1. When the total amount of hazardous materials exceeds 2,000ℓ, file an application for a "General Handling Site" permit.

2. When the total amount of hazardous materials is between 400ℓ or more and less than 2,000ℓ, file an application for a "Low-volume Hazardous Material Storage and Handling Site".

3. When the total mount of hazardous materials is less than 400ℓ, file an application as a "Facility using fire".

Refer to the "EDM Fire Prevention Guidelines" and instruction manual for details relating to EDM dielectric fluid and fire safety laws.

■Sliding surface lubricant (Mobil DTE26 "Exxon Mobil")

Table of sliding surface lubricant properties

Item \ Product brand	Mobil DTE26
Density g/cm³ (@15°C)	0.881
Ignition point °C (PM)	204
Kinematic viscosity mm²/s (@40˚C)	68.0
Appearance	Yellow

※Contact the manufacturer for the Material Safety Data Sheet.

Installation conditions

■Installation location

Select a place that satisfies the following conditions for installing the EDM.

(1) Room temperature
* Recommended room temperature: 20±1°C (68±2°F)
* Usable temperature range 5 to 35°C (41 to 95°F)
Fluctuation of the temperature will directly affect the machine accuracy, so to maintain accuracy, select a place with little temperature fluctuation. Note that the machining accuracy may be adversely affected in an environment where the temperature fluctuates by 3°C (5.4°F) or more within 24 hours, or 1°C (1.8°F) or more within one hour. Make sure that the machine body is not directly subject to the airflow from air conditioners or to direct sunlight.

(2) Atmosphere
Install the EDM in an environment with no corrosive gases, such as acid or salt, or mist, and with low levels of dust. Abrasive powder from grinding machinery can adversely affect the machine's sliding sections and drive sections such as the ball screws, so pay special attention to the installation place. (Separate the EDM from the grinding machinery, install in a separate room, etc.)

(3) Humidity
Within 35 to 75%RH (with no dew condensation).

(4) Machine heating value
Use the equipment capacity to calculate the EDM's heating value required for designing a constant-temperature room.

Heating value (kW)
= Equipment capacity (kVA) x 0.6
Example: For EA12VM + FP80V, 7.0kVA x 0.6 = 4.2kW

The above value is a guideline. Consult with the constant-temperature room maker for details.

(5) Floor vibration
EA Series (EA8, EA30, EA40, EA50), EA12V-A, EA28V-A
* Select an installation floor where vibration and impact will not be conveyed.
As a reference, the vibration level should have a maximum amplitude of 5μm or less at a frequency of 10 to 20[Hz].
EA8PV-A, MA2000, VH10
* Select an installation floor where vibration and impact will not be conveyed.
As a reference, the vibration level should have a maximum amplitude of 2μm or less at a frequency of 10 to 20[Hz].
* Consult with the contractor or vibration measuring instrument maker for details on the measuring method.

(6) Foundation
Install the EDM on a floor which can withstand the weight of the equipment. A concrete floor 400mm (16in) or thicker is recommended.

(7) Room construction
The room where the EDM is to be installed must be a non-flammable or fire-proof structure.
Contact your local fire department for details.

(8) Ventilation of combustible vapors
Install a ventilator to effectively remove combustible vapors and fine powders.

■Grounding work

The EDM must always be grounded to prevent external noise, prevent radio disturbance, and prevent earth leakage.
Class C grounding (grounding resistance 10Ω or less) as set forth in the Electric Facility Standards is recommended for the EDM.

(1) Class C grounding (isolated) is recommended (dedicated grounding for EDM).
Always use one-point grounding (Fig. 1).
Note) Provide isolated grounding for each machine.

(2) Common grounding can be used if noise from other equipment will not enter through the common grounding. The grounding cable must be connected independently up to the grounding station (Fig. 2).

(3) Use a 14mm² grounding wire.

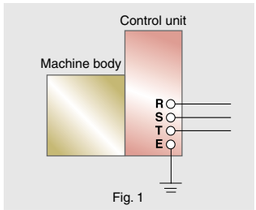


Fig. 1

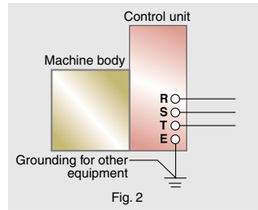


Fig. 2

■Shielded room

Provide a shielded room if the EDM affects televisions or other communication systems in the area. Observe the following points when installing the EDM in the shielded room.

(1) Ground the EDM in the shielded room (Fig. 3).

(2) If the EDM cannot be grounded in the shielded room, connect the EDM's grounding cable to the shielded room's grounding terminal (through-bolt) as shown in Fig. 4.

(3) Consult with your Mitsubishi Electric sales office or dealer for details on setting up a shielded room.

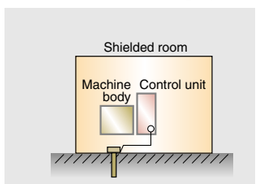


Fig. 3

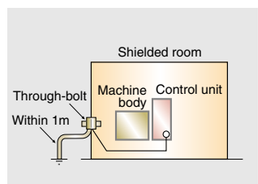


Fig. 4

Selecting the power facility capacity

Before installing an EDM, ensure that sufficient power capacity can be supplied to meet the total power input requirements. The total power input requirements include the power for the main unit and accessories (options).

Facility capacity (**kVA**) = Total power input (Machine input + power supply input + dielectric fluid temperature control unit input) (**kVA**)

No-fuse breaker and earth-leakage breaker

When selecting a no-fuse breaker or earth-leakage breaker for the primary side of the EDM, calculate the total facility capacity, and select the breaker using the following table as a reference. The breakers in the following table allow for the rush current of the transformer in the power supply panel.

Total facility capacity (**kVA**)	No-fuse breaker	Earth-leakage breaker
～12	NF50-CW (50A)	NV50-CW (50A)
12～22	NF100-CW (100A)	NV100-CW (100A)
22～33	NF225-CP (150A)	NV225-CP (150A)
33～50	NF225-CP (200A)	NV225-CP (200A)

Precautions for selecting earth-leakage breakers

To prevent malfunctions caused by the external noise from control units, a filter is installed on the power supply input. By grounding one end of this filter, an earth-leakage current of approx. 30 to 40mA passes through this filter. If a highly sensitive earth-leakage breaker (sensitivity current 30mA) is installed, malfunctions could occur. Thus, a medium sensitivity earth-leakage breaker (sensitivity current 100 to 200mA) is recommended for the EDM. Class C grounding (grounding resistance 10Ω or less) is recommended for the EDM. If Class C grounding is provided, even if the sensitivity current is 200mA, the contact voltage will be 2V or less, and no problems will occur in preventing electric shock (application of tolerable contact current Class 2, 25V or less).

Selecting the power input cable size and input power voltage

The following table is a guide for calculating the appropriate power cable size to use based on total capacity.
The cable size should be sufficient to allow some leeway.

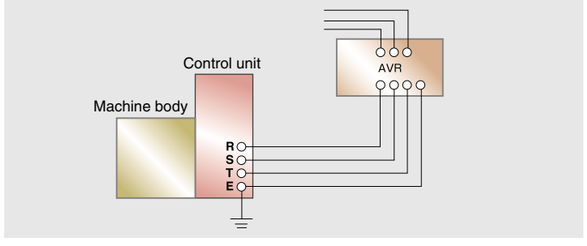
Total facility capacity (**kVA**)	Cable size (**mm²**)
～9	5.5
9～12	8.0
12～15	14.0
15～21	22.0
21～28	30.0
28～34	38.0

Stabilizing the power supply

EDM power supplies use the latest electronics technologies. Any large fluctuation in the voltage can cause an EDM to deviate from its optimum working conditions, and cause a reduction in efficiency. Although fluctuations within approx. ±5% of the rated voltage will not cause a problem, an automatic voltage regulator (AVR) should be used to stabilize fluctuations of ±10% or more that last for a long period of time (e.g., operating the EDM at 180V when rated voltage is 200V).

Harmonic distortion

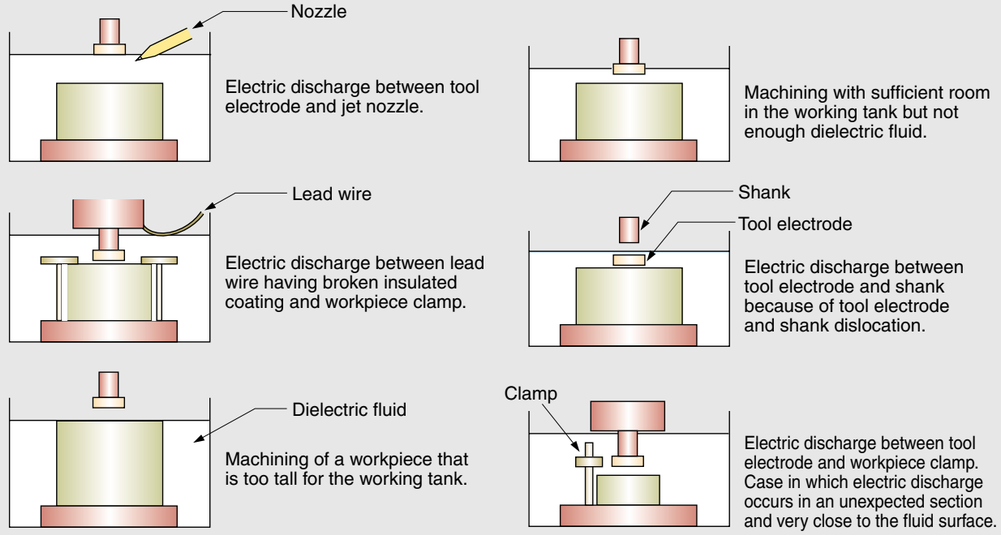
Harmonic distortion in the power supply could affect machining operation even when there is no voltage fluctuation. If such a problem occurs, avoid use near equipment that generates harmonic distortion, or provide measures such as a line filter.



Cautions

Preventing fires and accidents with EDMs

Never attempt the following operation methods. These are extremely hazardous.


Nozzle
Electric discharge between tool electrode and jet nozzle.
Machining with sufficient room in the working tank but not enough dielectric fluid.
Lead wire
Electric discharge between lead wire having broken insulated coating and workpiece clamp.
Shank
Tool electrode
Electric discharge between tool electrode and shank because of tool electrode and shank dislocation.
Dielectric fluid
Machining of a workpiece that is too tall for the working tank.
Clamp
Electric discharge between tool electrode and workpiece clamp. Case in which electric discharge occurs in an unexpected section and very close to the fluid surface.

- Ensure that the upper part of the workpiece is submerged by 50mm (1.97in) or more (FP60EA, FP60MA, FP80V) or 100mm (3.94in) or more (FP100EA, FP120V) from the surface of the dielectric fluid
- Never conduct spray machining as there is a risk of fire
- Do not use equipment that produces heat or sparks such as heating systems, welding machines, or grinding machinery near the EDM
- Always keep the area clean and tidy, and do not store flammable materials near the EDM
- Install an extra fire extinguisher in addition to the automatic fire extinguisher enclosed with the EDM
- Ensure that the area is sufficiently ventilated
- Monitoring automatic operation : For safety purposes, make sure an operator is always present during operation, even if various safety devices are equipped, so that appropriate actions can be taken

Safety measures

A dielectric fluid temperature detector, fluid level detector, abnormal machining detector and automatic fire extinguisher, standard equipment, and a flame-resistant metal hose is used. Following legal ordinances, a tank which has passed a water leakage test is used (for tank capacities less than 2,000 ℓ, tanks which have passed a voluntary water leakage test). Note that the safety devices must be periodically inspected. Refer to the instruction manual (safety manual) when using the EDM.

Certificate of voluntary water leakage test acceptance

Automatic fire extinguisher

When heat is detected, a light-water solution is automatically sprayed to extinguish the fire. Machining also stops automatically at this time.
A separate 100VAC power supply is required for the automatic fire extinguisher.

Dielectric fluid temperature and fluid level detector

Machining is automatically stopped when the dielectric fluid temperature reaches approx. 60℃, or when the fluid level drops during machining.

MITSUBISHI WIRE EDM & FINE HOLE EDM

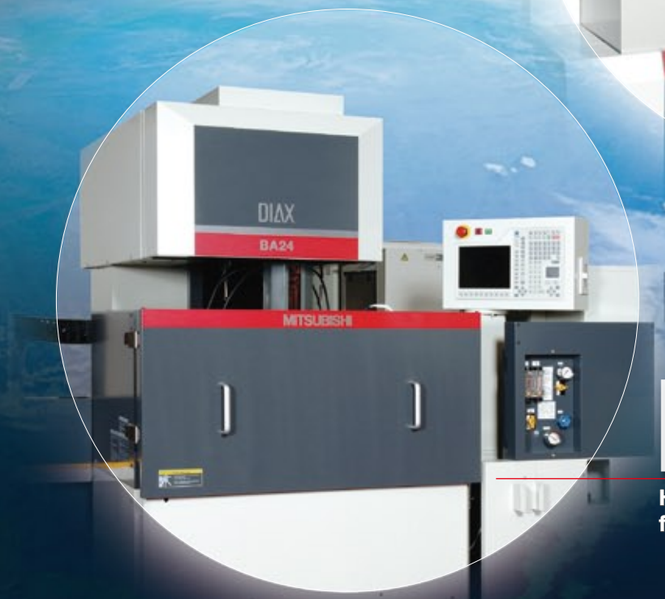
Ample lineup corresponding to needs for part machining to super-accurate mold machining.
Mitsubishi helps improve our customers' productivity with total solutions covering machine, generator, adaptive control, automated systems and networks.

PA Series
Ultra-high accuracy Wire EDM

Flagship series incorporating a transcendental machining performance

NA Series
High accuracy and high performance Wire EDM

A new standard machine that embodies the essence of innovative technology



BA Series
High-productivity basic model Wire EDM

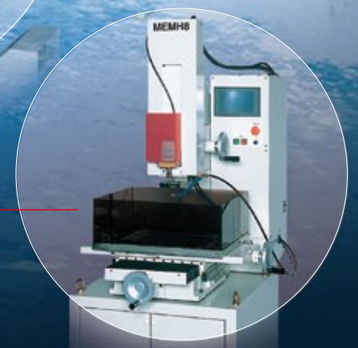
High-performance model for part to mold machining

VH
High accuracy Fine hole EDM

Machine fine holes with high-speed and high-accuracy using advanced technology

MEMH Series
Fine hole EDM

Fine hole machining shifted from drilling to electrical-discharge machining



Contact your local Mitsubishi Electric sales office or dealer for more details.

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NAGOYA WORKS: 1-14, YADA-MINAMI, 5-CHOME, HIGASHI-KU, NAGOYA 461-8670, JAPAN

* Not all models are supported for all countries and regions.
* Machine specifications differ according to the country and region, so please check with your dealer.
* Processing data provided in this brochure is for reference only.

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